ROYAL OBSERVATORY, GREENWICH,

London, S.E.

188

SIR,

I beg to inform you that the publication of the Royal Observatory mentioned on the opposite page has been forwarded to you by Post

and I beg to request you to be good enough to sign and return the accompanying receipt.*

I am, SIR,

Your obedient Servant,

W. H. M. CHRISTIE,

Astronomer Royal.

To J. Campbell, Esq

* Non-compliance with this request will be interpreted as an intimation that similar works are not desired in future.

& S (311 12 82

23

J. J. Campbell, Esq
[illegible]

J F Campbell
Niddry Lodge
Kensington
London W.

Friday June 29, 1883. receipt sent

RESULTS

OF THE

MAGNETICAL AND METEOROLOGICAL OBSERVATIONS

MADE AT

THE ROYAL OBSERVATORY, GREENWICH,

IN THE YEAR

1881:

UNDER THE DIRECTION OF

SIR GEORGE BIDDELL AIRY, K.C.B. M.A. LL.D. D.C.L.,
LATE ASTRONOMER ROYAL,

AND

W. H. M. CHRISTIE, M.A. F.R.S.,
ASTRONOMER ROYAL.

PUBLISHED BY ORDER OF THE BOARD OF ADMIRALTY
IN OBEDIENCE TO HER MAJESTY'S COMMAND.

LONDON:
PRINTED BY GEORGE E. B. EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

1883.

INDEX.

INDEX.

INDEX.

INDEX.

PAGE

RESULTS OF MAGNETICAL AND METEOROLOGICAL OBSERVATIONS—*concluded.*

ROYAL OBSERVATORY, GREENWICH.

RESULTS

OF

MAGNETICAL AND METEOROLOGICAL OBSERVATIONS.

1881.

GREENWICH MAGNETICAL AND METEOROLOGICAL OBSERVATIONS, 1881.

Introduction.

The observations from January 1 to August 14, contained in the present volume, were made and partly reduced under the superintendence of Sir G. B. Airy, K.C.B., as Astronomer Royal, before his resignation of that office on 1881 August 15.

§ 1. *Personal Establishment and Arrangements.*

During the year 1881 the establishment of Assistants in the Magnetical and Meteorological Department of the Royal Observatory consisted of William Ellis, Superintendent, and William Carpenter Nash, Assistant, who had the aid usually of four Computers. The names of the Computers who were employed at different times during the year 1881 are, John A. Greengrass, William Hugo, Ernest E. McClellan, George W. Stafford, Edwin Jeffery, and William J. Sanders.

Mr. Ellis controls and superintends the whole of the work of the Department. Mr. Nash attends generally to instrumental adjustments, the determination of the values of instrumental constants, and makes the more delicate magnetic observations. The routine magnetical and meteorological observations have been in general made by the Computers.

§ 2. *General Description of the Buildings and Instruments of the Magnetical and Meteorological Observatory.*

The Magnetical and Meteorological Observatory was erected in the year 1838. Its northern face is distant about 170 feet south-south-east from the nearest point of the South-East Dome, and about 35 feet south from the carpenters' workshop. It is based on concrete and built of wood, united for the most part by pegs of bamboo; no iron was intentionally admitted in its construction, or in subsequent alterations. Its form is that of a cross, the arms of the cross being nearly in the directions of the cardinal magnetic points as they were in 1838. The northern arm is longer than the others, and is separated from them by a partition, and used as a computing room; the stove which warms this room, and its flue, are of copper. The remaining portion, consisting of the eastern, southern, and western arms, is known as the Upper Magnet Room. The upper declination magnet and its theodolite for determination

of absolute declination, are placed in the southern arm, an opening in the roof allowing circumpolar stars to be observed by the theodolite for determination of the position of the astronomical meridian. Both the magnet and its theodolite are supported on piers built from the ground. In the eastern arm is placed the Thomson electrometer for photographic record of the variations of atmospheric electricity, its water cistern being supported by a platform fixed to the western side of the southern arm, near the ceiling. The Standard barometer is suspended near the point of junction of the southern and western arms. The Sidereal clock, Grimaldo and Johnson, is fixed at the junction of the eastern and southern arms, and there is in addition a mean solar chronometer, McCabe No. 649, for general use.

Until the year 1863 the horizontal and vertical force magnets were also located in the Upper Magnet Room, the upper declination magnet being up to that time employed for photographic record of the variations of declination, as well as for absolute measure of the element. But experience having shown that the horizontal and vertical force magnets were subject in the upper room to too great variations of temperature, a room known as the Magnet Basement was in the year 1864 excavated below the Upper Magnet Room, and the horizontal and vertical force magnets, as well as a new declination magnet for photographic record of declination, were mounted therein, in order that they might be less exposed to changes of temperature. The Magnet Basement is of the same dimensions as the Upper Magnet Room. The lower declination magnet and the horizontal force and vertical force magnets, as now located in the Basement, are used entirely for record of the variations of the respective magnetic elements. The declination magnet is suspended in the southern arm, immediately under the upper declination magnet, in order that the position of the latter should not be affected thereby; the horizontal and vertical force magnets are placed in the eastern and western arms respectively, in positions nearly underneath those which they occupied when in the Upper Magnet Room. All are mounted on or suspended from supports carried by piers built from the ground. A photographic barometer is fixed to the northern wall of the Basement, and an apparatus for photographic registration of earth currents is placed near the southern wall of the eastern arm. A clock of peculiar construction for interruption of the photographic traces at each hour is fixed to the pier which supports the upper declination theodolite. The mean-time clock is attached to the western wall of the southern arm. On the northern wall, near the photographic barometer, is fixed the Sidereal standard clock of the Astronomical Observatory, Dent 1906, communicating with the chronograph and with clocks of the Astronomical Department by means of underground wires. This clock is placed in the Magnet Basement, because of its nearly uniform temperature.

The Basement is warmed when necessary by a gas stove (of copper), and ventilated

by means of a large copper tube nearly two feet in diameter, which receives the flues from the stove and all gas-lights and passes through the Upper Magnet Room to a revolving cowl above the roof. Each of the arms of the Basement has a well window facing the south, but these wells are usually closely stopped.

A platform erected above the roof of the Magnet House is used for the observation of meteors. The sunshine instrument and a rain gauge are placed on a table on this platform.

An apparatus for naphthalizing the gas used for the photographic registration is mounted in a small detached zinc-built room adjacent to the computing room on its western side.

To the south of the Magnet House, in what is known as the Magnetic Ground, is an open shed, consisting principally of a roof supported on four posts, under which is placed the photographic dry-bulb and wet-bulb thermometer apparatus. On the roof of this shed there is fixed an ozone box and a rain gauge, and close to its north-western corner are placed the earth thermometers, the upper portions of which, projecting above the ground, are protected by a small wooden hut. About 25 feet to the west of the photographic thermometers is situated the thermometer stand carrying the thermometers used for eye observations, and adjacent thereto on the north side are several rain gauges.

The Magnetic Ground is bounded on its south side by a range of seven rooms, known as the Magnetic Offices. No. 1 is used as a general store room, and in it is placed the Watchman's Clock; Nos. 2, 3, and 4 are used for photographic purposes in connexion with the Photoheliograph, placed in a dome adjoining No. 3, on its south side: Nos. 5 and 6 are store rooms. In No. 7 are placed the Dip Instrument and Deflexion apparatus.

To the south of the Magnetic Offices, in what is known as the South Ground, are placed the thermometers for solar and terrestrial radiation; they are laid on short grass, and freely exposed to the sky.

Two Anemometers, Osler's, giving continuous record of direction and pressure of wind and amount of rain, and Robinson's, giving continuous record of velocity, are fixed, the former above the north-western turret of the Octagon Room (the ancient part of the Observatory), the latter above the small building on the roof of the Octagon Room.

Regular observation of the principal magnetical and meteorological elements was commenced in the autumn of the year 1840, and has been continued, with some additions to the subjects of observation, to the present time. Until the end of the year 1847 observations were in general made every two hours, but at the beginning of the year 1848 these were superseded by the introduction of the method of photo-

graphic registration, by which means a continuous record of the various elements is obtained.

For information on many particulars concerning the history of the Magnetical and Meteorological Observatory, especially in regard to alterations not recited in this volume, which from time to time have been made, the reader is referred to the Introduction to the Magnetical and Meteorological Observations for the year 1880 and previous years, and to the Descriptions of the Buildings and Grounds, with accompanying Plans, given in the Volumes of Astronomical Observations for the years 1845 and 1862.

§ 3. *Subjects of Observation in the year* 1881.

These comprise determinations of absolute magnetic declination, horizontal force, and dip: continuous photographic record of the variations of declination, horizontal force, and vertical force, and of the earth currents indicated in two distinct lines of wire: eye observation of the ordinary meteorological instruments, including the barometer, dry and wet bulb thermometers, and radiation and earth thermometers; continuous photographic record of the variations of the barometer, dry and wet bulb thermometers, and electrometer (for atmospheric electricity); continuous automatic record of the direction, pressure, and velocity of the wind, and of the amount of rain; registration of the duration of sunshine, and amount of ozone; observation of some of the principal meteor showers; and general record of ordinary atmospheric changes of weather, including numerical estimation of the amount of cloud.

§ 4. *Magnetic Instruments.*

UPPER DECLINATION MAGNET AND ITS THEODOLITE.—The upper declination magnet is by Meyerstein of Göttingen; it is a bar of hard steel, 2 feet long, 1½ inch broad, and about ¼ inch thick, and is employed solely for the determination of absolute declination. The magnet carrier was also made by Meyerstein, since however altered by Troughton and Simms; the magnet is fixed therein by two pinching screws. To a stalk extending upwards from the magnet carrier is attached the torsion circle, which consists of two circular brass discs, one turning independently on the other on their common vertical axis, the lower and graduated portion being firmly fixed to the stalk of the magnet carrier; to the upper portion carrying the vernier is attached, by a hook, the suspension skein. This is of silk, and consists of several fibres united by juxtaposition, without apparent twist; its length is about 6 feet.

The magnet, with its suspending skein, &c., is carried by a braced wooden tripod stand, whose feet rest on slates covering brick piers, built from the ground and rising through the Magnet Basement nearly to the roof. The upper end of the suspension skein is attached to a short square wooden rod, sliding in the corresponding square hole of a fixed wooden bracket. To the upper end of the rod is fixed a leather strap, which, passing over two brass pulleys carried by the upper portion of the tripod stand, is attached to a cord which passes down to a small windlass fixed to the stand. Thus in raising or lowering the magnet, an operation necessary in determinations of its collimation error, no alteration is made in the length of the suspension skein. The magnet is inclosed in a double rectangular wooden box (one box within another), both boxes being covered with gilt paper on their exterior and interior sides, and having holes at their south and north ends, for illumination of the magnet-collimator and for viewing the collimator by the theodolite telescope respectively. The holes in the outer box are covered with glass. The magnet-collimator is formed by a diagonally placed cobweb cross, and a lens of 13 inches focal length and nearly 2 inches aperture, carried respectively by two sliding frames fixed by pinching screws to the south and north arms of the magnet. The cobweb cross is in the principal focus of the lens, and its image in the theodolite telescope is well seen. From the lower side of the magnet carrier a rod extends downwards, terminating below the magnet box in a horizontal brass bar immersed in water, for the purpose of checking small vibrations of the magnet.

The theodolite, by which the position of the upper declination magnet is observed, is by Troughton and Simms. It is planted about 7 feet north of the magnet. The radius of its horizontal circle is 8·3 inches, and the circle is divided to 5′, and read, by three verniers, to 5″. The theodolite has three foot-screws, which rest in brass channels let into the stone pier placed upon the brick pier which rises from the ground through the Magnet Basement. The length of the telescope is 21 inches, and the aperture of its object glass 2 inches: it is carried by a horizontal transit axis $10\frac{1}{2}$ inches long, supported on Y's carried by the central vertical axis of the theodolite. The eye-piece has one fixed horizontal wire and one vertical wire moved by a micrometer-screw, the field of view in the observation of stars being illuminated through the pivot of the transit-axis on that side of the telescope which carries the micrometer-head. The value of one division of the striding level is considered to be equal to 1″·05. The opening in the roof of the Magnet House permits of observation of circumpolar stars as high as δ Ursæ Minoris above the pole and as low as β Cephei below the pole. A fixed mark, consisting of a small hole in a plate of metal, placed on one of the buildings of the Astronomical Observatory, at a distance of about 270 feet from the theodolite, is, in addition, provided by which to check the continued steadiness of the theodolite.

The inequality of the pivots of the axis of the theodolite telescope was found from several independent determinations made at different times to be very small. It appears that when the level indicates the axis to be horizontal the pivot at the illuminated end of the axis is really too low by $1^{div}\cdot 3$, equivalent to $1''\cdot 4$.

The value in arc of one revolution of the telescope-micrometer is $1'.\ 34''\cdot 2$.

The reading for the line of collimation of the theodolite telescope was found, by fifteen double observations, made on 1881 March 29, to be $100^{r}\cdot 217$: 10 double observations made on 1881 September 8, gave $100^{r}\cdot 178$. The value used throughout the year 1881 was $100^{r}\cdot 202$, the same that was employed during the year 1880.

The error of collimation of the plane glass in front of the outer box of the declination-magnet at that end of the box towards the theodolite was determined by 10 double observations made on 1881 March 29, which showed that in the ordinary position of the glass the theodolite readings were diminished by $19''\cdot 7$. Another set of observations made on 1881 September 8, gave $18''\cdot 6$. The mean of these, $19''\cdot 1$, has been added to all readings throughout the year 1881.

The error of collimation of the magnet collimator is found by observing the position of the magnet, first with its collimator in the usual position (above the magnet), then with the collimator reversed (or with the magnet placed in its carrier with the collimator below), repeating the observations several times. The value used during the year 1881 was $26'.\ 7''\cdot 8$, being the mean of determinations made on 1878 December 10, 1879 December 9, 1880 October 26, and 1881 September 8, giving respectively $26'.\ 13''\cdot 6$, $26'.\ 2''\cdot 2$, $25'.\ 56''\cdot 6$, and $26'.\ 18''\cdot 9$. With the collimator in its usual position, above the magnet, the amount has to be subtracted from all readings.

The effect of torsion of the suspending skein is eliminated by turning the lower portion of the torsion-circle until a brass bar (of the same size as the magnet, and weighted with lead weights to be also of equal weight), inserted in place of the magnet, rests in the plane of the magnetic meridian. The brass bar is thus inserted from time to time as may appear necessary, and whenever the adjustment is found not to have been sufficiently close, the observed positions of the magnet are corrected for the amount by which the magnet is deflected from the meridian by the torsion force of the skein. Such correction is determined experimentally, with the magnet in position, by changing the reading of the torsion circle by a definite amount, usually 90°, thus giving the skein the same amount of azimuthal twist, and observing, by the theodolite, the displacement in the position of the magnet thereby produced, from which is derived the ratio of the torsion force of the skein to the earth's magnetic force. In this way the torsion force of the skein was, on 1879 December 9, found to be $\frac{1}{176}$th part of the earth's magnetic force: on 1881 September 8, it was found to be $\frac{1}{174}$th part. At all times of examination in the year 1881, however, the plane

in which the suspension skein was free from torsion so nearly coincided with the magnetic meridian that no correction of the absolute measures of magnetic declination for deviation of the plane of no torsion was at any time required.

The time of vibration of the upper declination magnet under the influence of terrestrial magnetism was found on 1880 December 29, to be $30^{s}\cdot78$, and on 1881 September 9, $31^{s}\cdot30$.

The reading of the azimuthal circle of the theodolite corresponding to the astronomical meridian is determined by occasional observation of the stars Polaris and δ Ursæ Minoris, made generally at the time at which the observer attends in the evening for other duties. The error of level is found by application of the spirit level at the time of observation.

Observations for determining the reading of the circle corresponding to the astronomical meridian are made about once in each month; the fixed mark is usually observed weekly. The concluded mean reading of the circle for the south astronomical meridian, used during the year 1881 for reduction of the observations of the declination magnet, was until August 4, $27^{\circ}.\ 5'.\ 38''\cdot7$; from August 5 until November 22, $27^{\circ}.\ 4'.\ 23''\cdot3$; from November 22 until November 24, $27^{\circ}.\ 4'.\ 2''\cdot6$; and from November 25 to the end of the year, $27^{\circ}.\ 3'.\ 15''\cdot0$.

In regard to the manner of making and reducing observations made with the upper declination magnet, the observer on looking into the theodolite telescope sees the image of the diagonally placed cross of the magnet collimator vibrating alternately right and left. The time of vibration of the magnet being about 30 seconds, the observer first applies his eye to the telescope about one minute, or two vibrations, before the pre-arranged time of observation, and, with the vertical wire carried by the telescope-micrometer, bisects the magnet-cross at its next extreme limit of vibration, reading the micrometer. He similarly observes the next following extreme vibration, in the opposite direction, and so on, taking in all four readings. The mean of each pair of adjacent readings of the micrometer is taken, giving three means, and the mean of these three is taken as the adopted reading. In practice this is done by adding the first and fourth readings to twice the second and third, and dividing the sum by 6. Should the magnet be nearly free from vibration, two bisections only of the cross are made, one at the vibration next before the pre-arranged time, the other at the vibration following. The verniers of the theodolite-circle are then read. The excess of the adopted micrometer-reading above the reading for the line of collimation of the telescope being converted into arc and applied to the mean circle-reading, and also the corrections for collimation of the magnet and for collimation of the plane glass in front of its box, the concluded circle-reading corresponding to the position of the magnet is found. The difference

between this reading and the adopted reading of the circle for the south astronomical meridian gives, when, as is usually the case, no correction for torsion of the skein is necessary, the observed value of absolute declination, afterwards used for determining the value of the photographed base line on the photographic register of the lower declination magnet. The times of observation of the upper declination magnet are usually $1^h. 5^m$, $3^h. 5^m$, $9^h. 5$, and $21^h. 5^m$ of Greenwich mean time.

LOWER DECLINATION MAGNET.—The lower declination magnet is used simply for the purpose of obtaining photographic register of the variations of magnetic declination. It is by Troughton and Simms, and is of the same dimensions as the upper declination magnet, being 2 feet long, $1\frac{1}{2}$ inch broad, and $\frac{1}{4}$ inch thick. The magnet is suspended, in the Magnet Basement, immediately below the upper declination magnet, in order that the absolute measure of declination by the upper magnet should not be affected by the proximity of the lower magnet.

The manner of suspension of the magnet is in general similar to that of the upper declination magnet, the suspension pulleys being carried by a small pier built on one of the crossed slates resting on the brick piers rising up from the ground. The length of free suspending skein is about 6 feet, but, unlike the arrangement adopted for the upper magnet, the skein is itself carried over the suspension pulleys. The position of the azimuthal plane in which the brass bar rests, when substituted for the magnet, is examined from time to time, and adjustment made as necessary, to keep this plane in or near the magnetic meridian, such exact adjustment as is required for the upper declination-magnet being not here necessary.

To destroy the small accidental vibrations to which the magnet would be otherwise liable, it is encircled by a damper consisting of a copper bar, about 1 inch square, which is bent into a long oval form, the plane of the oval being vertical; a lateral bend is made in the upper bar of the oval to avoid interference with the suspension piece of the magnet. The effect of the damper is to reduce the amplitude of the oscillation after every complete or double vibration of the magnet in the proportion of 5 : 2 nearly.

In regard to photographic arrangements, it may be convenient, before proceeding to speak of the details peculiar to each instrument, to remark that the general principle adopted for obtaining continuous photographic record is the same for all instruments. For the register of each indication an accurately turned cylinder of ebonite is provided, the axis of the cylinder being placed parallel to the direction of the change of indication to be registered. If, as is usually the case, there are two indications whose movements are in the same direction, both may be registered on the same cylinder: thus the movements in the case of magnetic declination and horizontal magnetic force, being both horizontal, can be registered on different parts of one cylinder with axis horizontal: so also can two different galvanic earth

currents. The movements in the case of vertical magnetic force, and of the barometer, being both vertical, can similarly be registered on different parts of one cylinder having its axis vertical, as also can the indications of the dry-bulb and wet-bulb thermometers. In the electrometer the movement is horizontal, for which a horizontal cylinder is provided, no other register being made on this cylinder.

The cylinder is in each case driven by chronometer or accurate clock-work to ensure uniform motion. The pivots of the horizontal cylinders turn on anti-friction wheels: the vertical cylinders rest on a circular plate turning on anti-friction wheels, the driving mechanism being placed below. A sheet of sensitized paper being wrapped round the cylinder, and a cylindrical glass cover, open at one end, slipped over it, the cylinder so prepared is placed in position, and connected with the clock-movement: it is then ready to receive the photographic record, the optical arrangements for producing which will be found explained in the special description of each particular instrument. The sheets are removed from the cylinders and fresh sheets supplied every day, usually at noon. On each sheet, where necessary, an invariable reference line is also photographed, the arrangements for which will be more particularly described in each special case. All parts of the apparatus and all parts of the paths of light are protected, as found necessary, by wood or zinc casings or tubes, blackened on the inside, in order to prevent stray exterior light from reaching the photographic paper.

Referring now specially to the lower declination magnet, there is attached to the magnet carrier, for the purpose of obtaining photographic register of the motions of the magnet, a concave mirror of speculum metal, 5 inches in diameter, which thus receives all the angular movements of the magnet. The revolving ebonite cylinder is $11\frac{1}{2}$ inches long and $14\frac{1}{4}$ inches in circumference: it is supported, in an approximately east and west position, on brass uprights carried by a metal plate, the whole being planted on a firm wooden platform, the supports of which rest on blocks driven into the ground. The platform is placed midway between the declination and horizontal force magnets, in order that the variations of magnetic declination and horizontal force may both be registered on the same cylinder, which makes one complete revolution in 26 hours.

The light used for obtaining the photographic record is that given by a flame of coal gas, charged with the vapour of coal naphtha. A vertical slit about $0^{\text{in}}\cdot3$ long and $0^{\text{in}}\cdot01$ wide, placed close to the light, is firmly supported on the pier which carries the magnet. It stands slightly out of the straight line joining the mirror and the registering cylinder, and its distance from the concave mirror of the magnet is about 25 inches. The distance of the axis of the registering cylinder from the concave mirror is 134·4 inches. Immediately above the cylinder, and parallel to its axis,

are placed two long reflecting prisms (each 11 inches in length) facing opposite ways towards the mirrors carried by the declination and horizontal force magnets respectively. The front surface of each prism is convex, being a portion of a horizontal cylinder. The light of the declination lamp, after passing through the vertical slit, falls on the concave mirror, and is thence reflected as a converging beam to form an image of the slit on the convex surface of the reflecting prism, by the action of which it is reflected downwards to the paper on the cylinder as a small spot of light. A small azimuthal adjustment of the concave mirror allows the position of the spot to be so adjusted that it shall fall not at the centre of the cylinder but rather towards its western side, in order that the declination trace shall not become mixed with that of horizontal force, which is made to fall towards the eastern side of the cylinder. The special advantage of the arrangement here described is that the registers of both magnets are made at the same part of the circumference of the cylinder, a line joining the two spots being parallel to its axis, so that when the traces on the paper are developed, the parts of the two registers which appear in juxtaposition correspond to the same Greenwich time.

By means of a small prism, fixed near to the registering cylinder, the light from another lamp is made to form a spot of light in a fixed position on the cylinder, so that, as the cylinder revolves, an invariable reference or base line is traced out on the paper, from which, in the interpretation of the records, the curve ordinates are measured.

A clock of special construction, arranged by Messrs. E. Dent and Co., acting upon a small shutter placed near the declination slit, cuts off the light from the mirror two minutes before each hour, and lets it in again two minutes after the hour, thus producing at each hour a visible interruption in the trace, and so ensuring accuracy as regards time scale. By means of another shutter the observer occasionally cuts off the light for a few minutes, registering the times at which it was cut off and at which it was again let in. The visible interruptions thus made at definite times in the trace obviate any possibility of error being made by wrong numeration of the hourly breaks.

The usual hour of changing the photographic sheet is noon, but on Sundays, and occasionally on other days, this rule is in some measure departed from. To obviate any uncertainty that might on such occasions arise from the mixing on the paper of the two ends of a trace slightly longer than 24 hours, it was, as has been mentioned, arranged that one revolution of the cylinder should be made in 26 hours. The actual length of 24 hours on the sheet is about 13·3 inches.

The scale for measurement of ordinates of the photographic curve is thus determined. The distance from the concave mirror to the surface of the cylinder,

in the actual path of the ray of light through the prism, is practically the same as the horizontal distance of the centre of the cylinder from the mirror, 134·4 inches. A movement of 1° of the mirror produces a movement of 2° in the reflected ray. From this it is found that 1° of movement of the mirror, representing a change of 1° of magnetic declination, is equal to 4·691 inches on the photographic paper. A small scale of pasteboard is therefore prepared, graduated on this unit to degrees and minutes. The ordinate of the curve as referred to the invariable base line being measured for the times at which absolute values of declination were determined by the upper declination magnet, usually four times daily, the apparent value of the invariable base line, as inferred from each observation, is found. The process assumes that the movements of the upper and lower declination magnets are precisely similar. The separate base line values being divided into groups, usually monthly, a mean base line value is adopted for use through each group. This adopted base line value is written upon every sheet. Then, by the same pasteboard scale, there is laid down, conveniently near to the photographic trace, a new base line, whose ordinate represents some whole number of degrees or other convenient quantity. Thus every sheet carries its own scale of magnetic measure.

On 1881 January 19, the suspension skein of the magnet gave way; it was replaced by a new one, and registration re-commenced on January 21. On June 28 the driving chronometer failed; it was in the hands of Messrs. E. Dent and Co. for repair until July 11, on which day registration was again commenced. From September 23 to 28 registration was again interrupted during alteration of the platform on which the registering apparatus is planted.

HORIZONTAL FORCE MAGNET.—The horizontal force magnet, for measure of the variations of horizontal magnetic force, was furnished by Meyerstein of Göttingen, and like the two declination magnets, is 2 feet long, $1\frac{1}{2}$ inch broad, and about $\frac{1}{4}$ inch thick. For support of its suspension skein the back and sides of its brick pier rise through the eastern arm of the Magnetic Basement to the Upper Magnet Room, being there covered by a slate slab, to the top of which a brass plate is attached, carrying, immediately above the magnet, two brass pulleys, with their axes in the same east and west line, and at the back of the pier, and opposite to these pulleys, two others, with their axes similarly in an east and west line: these constitute the upper suspension piece, and support the upper portions of the two branches of the suspension skein. The two lower pulleys, having their axes in the same horizontal plane, and their grooves in the same vertical plane, are attached to a small horizontal bar which forms the upper portion of the torsion circle: it carries the verniers for reading the torsion circle, and can be turned independently of the lower and graduated portion of the torsion circle, below which, and in rigid connexion with it, is the magnet carrier.

The suspension skein is led under the two pulleys carried by the upper portion of the torsion circle, its two branches then rise up and pass over the front pulleys of the upper suspension piece, thence to and over the back pulleys, thence descending to a single pulley, round which the two branches are tied: from this pulley a cord goes to a small windlass fixed to the back of the pier. The effective length of each of the two branches of the suspension skein is about $7^{ft}\ 6^{in}$. The distance between the branches of the skein, where they pass over the upper pulleys, is $1^{in}{\cdot}14$: at the lower pulleys the distance between the branches is $0^{in}{\cdot}80$. The two branches are not intended to hang in one plane, but are to be so twisted that their torsion force will maintain the magnet in a direction very nearly east and west magnetic, the marked end being west. In this state an increase of horizontal magnetic force draws the marked end of the magnet towards the north, whilst a diminution of horizontal force allows the torsion force to draw the marked end towards the south. An oval copper bar, exactly similar to that used with the lower declination magnet, is applied also to the horizontal force magnet, for the purpose of diminishing the small accidental vibrations.

Below the magnet carrier there is attached a small plane mirror to which is directed a small telescope for the purpose of observing by reflexion the graduations of a horizontal opal glass scale, attached to the southern wall of the eastern arm of the basement. The magnet, with its plane mirror, hangs within a double rectangular box, covered with gilt paper in the same way as was described for the upper declination magnet. The numbers of the fixed scale increase from east to west, so that when the magnet is inserted in its usual position, with its marked end towards the west, increasing readings of the scale, as seen in the telescope, denote increasing horizontal force. The normal to the scale that meets the centre of the plane mirror is situated at the division 51 of the scale nearly, the distance of the scale from the centre of the plane mirror being 90·84 inches. The angle between the normal to the scale, which coincides nearly with the normal to the axis of the magnet, and the axis of the fixed telescope is about 38°, the plane of the mirror is therefore inclined to the axis of the magnet by about 19°.

To adjust the magnet so that it shall be truly transverse to the magnetic meridian, which position is necessary in order that the indications of the instrument may apply truly to changes in the magnitude of horizontal magnetic force, without regard to changes of direction, the time of vibration of the magnet and the reading of the fixed scale are determined for different readings of the torsion circle. In regard to the interpretation of such experiments the following explanation may be premised.

Suppose that the magnet is suspended in its carrier with its marked end in a magnetic westerly direction, not exactly west but in any westerly direction, and suppose that, by means of the fixed telescope, the reading of the scale is taken. The

position of the axis of the magnet is thereby defined. Now let the magnet be taken out of its carrier, and replaced with its marked end easterly. The terrestrial magnetic force will now act, as regards torsion, in the direction opposite to that in which it acted before, and the magnet will take up a different position. But by turning the torsion circle, and thereby changing the amount and direction of the torsion force produced by the oblique tension of the two branches of the suspending skein, the magnet may be made to take the same position as before, but with reversed direction of poles, which will be proved by the reading of the scale, as seen in the fixed telescope, being the same. The reading of the torsion circle will now be different, the effect of the operation being to give the difference of torsion circle reading for the same position of the magnet axis, but with the marked end opposite ways, without however affording any information as to whether the magnet axis is accurately transverse to the magnetic meridian, inasmuch as the same operation can be performed whether the magnet axis be transverse or not.

But there is another observation which will indicate whether the magnet axis is or is not accurately transverse. Let the time of vibration be, in addition, taken in each position of the magnet. Resolve the terrestrial magnetic force acting on the poles of the magnet into two parts, one transverse to the magnet, the other longitudinal. In the two positions of the magnet, marked end westerly and marked end easterly, the magnitude of the transversal force is the same, and the changes which the torsion undergoes in a vibration of given extent are the same, and, if there were no other force, the time of vibration would also be the same. But there is another force, the longitudinal force, and when the marked end is northerly this tends from the centre of the magnet's length, and when it is southerly it tends towards the centre of the magnet's length, and in a vibration of given extent this produces force, in one case increasing that due to the torsion, and in the other case diminishing it. The times of vibration will therefore be different. There is only one exception to this, which is when the magnet axis is transverse to the magnetic meridian, in which case the longitudinal force vanishes.

The criterion then of the position truly transverse to the meridian is this. Find the readings of the torsion circle which, with the magnet in reversed positions, will give the same readings of the scale and the same time of vibration for the magnet. With such readings of the torsion circle the magnet is, in either position, transverse to the meridian, and the difference of readings is the difference between the position in which the terrestrial magnetism acting on the magnet twists it one way and the position in which the same force twists it the opposite way, and is therefore double of the angle due to the torsion force of the suspending lines when they, in either position, neutralize the force of terrestrial magnetism.

On 1880 December 30, the suspension skein, having shown signs of weakness,

was removed, and a new skein mounted. On December 31 the following observations were made.

1880, Day.	The Marked End of the Magnet. West. Torsion-Circle Reading.	West. Scale Reading.	West. Difference of Scale Readings for change of 1° of Torsion-Circle Reading.	West. Mean of the Times of Vibration.	East. Torsion-Circle Reading.	East. Scale Reading.	East. Difference of Scale Readings for change of 1° of Torsion-Circle Reading.	East. Mean of the Times of Vibration.
	°	div.	div.	s	°	div.	div.	s
Dec. 31	144	36·80	8·46	21·30	227	32·52	7·55	20·50
	145	45·26	7·89	21·12	228	40·07	7·28	20·62
	146	53·15	8·94	20·94	229	47·35	7·97	20·76
	147	62·09	8·06	20·74	230	55·32	7·94	20·90
	148	70·15		20·54	231	63·26	8·67	21·00
					232	71·93		21·12

From these observations it appeared that the times of vibration and scale readings were sensibly the same when the torsion circle read 146°. 15′, marked end west, and 230°. 0′, marked end east, the difference being 83°. 45′. Half this difference, or 41°. 52′·5, is therefore the angle of torsion when the magnet is transverse to the meridian. The value similarly found from another set of observations made 1882 January 3, was 42°. 9′·0. The value adopted in the reduction of the observations during the year 1881 was 42°. 0′.

The adopted reading of torsion-circle, for transverse position of the magnet, the marked end being west, was 146° throughout the year.

The angle through which the magnet turns to produce a change of one division of scale reading, and the corresponding variation of horizontal force in terms of the whole horizontal force, is thus found.

The length of $30^{\text{div}}{\cdot}85$ of the fixed scale is exactly 12 inches, and the distance of the centre of the face of the plane mirror from the scale 90·84 inches; consequently the angle at the mirror subtended by one division of the scale is 14′. 43″·2, or for change of one division of scale-reading the magnet is turned through an angle of 7′. 21″·6.

The variation of horizontal force, in terms of the whole horizontal force, producing angular motion of the magnet corresponding to change of one division of scale reading = cotan. angle of torsion × value of one division in terms of radius. Using the numbers above given, the change of horizontal force corresponding to change of one division of scale-reading was found to be 0·002378, which value has

been used throughout the year 1881 for conversion of the observed scale-readings into parts of the whole horizontal force.

In regard to the manner of making observations with the horizontal force magnet.—A fine vertical wire is fixed in the field of view of the observing telescope, across which the graduations of the fixed scale, as reflected by the plane mirror carried by the magnet, are seen to pass alternately right and left as the magnet oscillates, and the scale reading for the extreme points of vibration is easily taken. The hours of observation are usually 1^h, 3^h, 9^h, and 21^h of Greenwich mean time. Remarking that the time of vibration of the magnet is about 20 seconds, and that the observer looks into the telescope about 40 seconds before the pre-arranged time, the manner of making the observation is generally similar to that already described for the upper declination magnet.

A thermometer, the bulb of which reaches considerably below the attached scale, is so planted in a nearly upright position on the outer magnet box that the bulb projects into the interior of the inner box containing the magnet. Readings of this thermometer are usually taken at 0^h, 1^h, 2^h, 3^h, 9^h, 21^h, 22^h, and 23^h. Its index error is insignificant.

The photographic record of the movements of the horizontal force magnet is made on the same revolving cylinder as is used for record of the motions of the lower declination magnet. And as described for that magnet, there is also attached to the carrier of the horizontal force magnet a concave mirror, 4 inches in diameter. The arrangements as regards lamp, slit, and other parts are precisely similar to those for the lower declination magnet already described, and may be perfectly understood by reference to that description (pages *xi* and *xii*), in which was incidentally included an explanation of some parts specially referring to register of horizontal force. The distance of the vertical slit from the concave mirror of the magnet is about 21 inches, and the distance of the axis of the registering cylinder from the concave mirror is 136·8 inches, the slit standing slightly out of the straight line joining the mirror and the registering cylinder. The same invariable base line is used for measure of the horizontal force ordinates, and the register is similarly interrupted at each hour by the clock, and occasionally by the observer, for determination of time scale, the length of which is of course the same as that for declination.

The scale for measure of ordinates of the photographic curve is thus constructed. The distance from the concave mirror to the surface of the cylinder, in the actual path of the ray of light through the prism is (as for declination) practically the same as the horizontal distance of the centre of the cylinder from the mirror, or 136·8 inches. But, because of the reflexion at the concave mirror, the double of this measure, or 273·6 inches, is the distance that determines the extent of motion on

the cylinder of the spot of light, which, in inches, for a change of 0·01 part of the whole horizontal force will therefore be 273·6 × tan. angle of torsion × 0·01. Taking for angle of torsion 42°. 0′ the movement of the spot of light on the cylinder for a change of 0·01 of horizontal force is thus found to be 2·464 inches, and with this unit the pasteboard scale for measure of the curve ordinates for the year 1881 was prepared. The ordinates being measured for the times at which eye observations of the scale were made, combination of the measured ordinates with the observed scale readings converted into parts of the whole horizontal force, gives an apparent value of the invariable base line for each observation. These being divided into groups, mean base line values are adopted, written on the sheets, and new base lines laid down, exactly in the same way as described for declination.

The indications of horizontal force are in a slight degree affected by the small changes of temperature to which the Magnetic Basement is subject. The temperature coefficient of the magnet was determined by artificially heating the Magnetic Basement to different temperatures, and observing the change of position of the magnet thereby produced. This process seems preferable to others in which was observed the effect which the magnet, when inclosed within a copper trough or box and artificially heated by hot water or hot air to different temperatures, produced on another suspended magnet, since the result obtained includes the entire effect of temperature upon all the various parts of the mounting of the magnet, as well as on the magnet itself. Referring to previous volumes for details, it is sufficient here to state that from a series of experiments made in the early part of the year 1868 on the principle mentioned, it appeared that when the marked end of the horizontal force magnet was to the west (its ordinary position) a change of 1° of temperature (Fahrenheit) produced a change of ·000174 of the whole horizontal force, a smaller number of observations made with the marked end of the magnet east indicating that a change of 1° of temperature produced a change of ·000187 of horizontal force, increase of temperature in both cases being accompanied by decrease of magnetic force.

From June 28 to July 10 and from September 23 to 28 the register of horizontal force was interrupted for reasons which will be found mentioned on page *xiii*.

VERTICAL FORCE MAGNET.—The vertical force magnet, for measure of the variations of vertical magnetic force, is by Troughton and Simms. It is lozenge shaped, being broad at the centre and pointed at the ends, and is mounted on a solid brick pier capped with stone, situated in the western arm of the basement, its position being nearly symmetrical with that of the horizontal force magnet in the eastern arm. The supporting frame consists of two pillars, connected at their bases, on whose tops are the agate planes upon which rest the extreme parts of the continuous steel knife edge, attached to the magnet carrier by clamps and pinching screws. The knife

edge, eight inches long, passes through an aperture in the magnet. The axis of the magnet is approximately transverse to the magnetic meridian, its marked end being east; its axis of vibration is thus nearly north and south magnetic. The magnet carrier is of iron; at its southern end there is fixed a small plane mirror for use in eye observations, whose plane makes with the axis of the magnet an angle of $52\frac{3}{4}°$ nearly. A telescope fixed to the west side of the brick pier supporting the theodolite of the upper declination magnet is directed to the mirror, for observation by reflexion of the divisions of a vertical opal glass scale fixed to the pier that carries the telescope, very near to the telescope itself. The numbers of this fixed scale increase downwards, so that when the magnet is placed in its usual position with the marked end east, increasing readings of the scale, as seen in the telescope, denote increasing vertical force.

The magnet is placed excentrically between the bearing parts of its knife edge, nearer to the southern side, leaving a space of about four inches in the northern part of the iron frame, in which the concave mirror used for the photographic register is planted. Two screw stalks, carrying adjustible screw weights, are fixed to the magnet carrier, near its northern side: one stalk is horizontal, and a change in the position of the weight affects the position of equilibrium of the magnet: the other stalk is vertical, and change in the position of its weight affects the delicacy of the balance, and so varies the magnitude of its change of position produced by a given change in the vertical force of terrestrial magnetism.

The whole is enclosed in a rectangular box, resting upon the pier before mentioned, and having apertures, covered with glass, opposite to the two mirrors carried by the magnet.

The time of vibration of the magnet in the vertical plane is observed usually about once in each week, or more often should it appear to be desirable. From observations made on 30 days between January 1 and May 31, the time of vibration was found to be $16^{s}\cdot157$, and from observations made on 35 days between June 1 and December 31, $15^{s}\cdot584$.

The time of vibration of the magnet in the horizontal plane was taken to be $17^{s}\cdot255$, as determined from 500 vibrations on 1879 December 31, when the magnet with all its attached parts was suspended from a tripod in the Magnetic Office No. 6, its broad side being in a plane parallel to the horizon, so that its moment of inertia was the same as when it is in observation. A telescope, with a wire in its focus, being directed to the plane mirror carried by the magnet, a scale of numbers was placed on the floor, at right angles to the long axis of the magnet, which scale, by reflexion, could be seen in the fixed telescope. The magnet was observed only when swinging through a small arc.

The length of the normal to the fixed vertical scale that meets the face of the plane mirror is 186·07 inches, and $30^{div}\cdot85$ of the scale correspond to 12 inches.

Consequently the angle which one division of the scale subtends, as seen from the mirror, is 7′. 11″·2, or the angular movement of the normal to the mirror, corresponding to a change of one division of scale reading, is 3′. 35″·6.

But the angular movement of the normal to the mirror is not the same as the angular movement of the magnet, but is less in the proportion of unity to the cosine of the angle which the normal to the mirror makes with the magnet, or in the proportion of unity to the sine of the angle which the plane of the mirror makes with the magnet. This angle, as already stated, is $52\frac{3}{4}°$, therefore dividing the result just obtained, 3′. 35″·6, by Sin. $52\frac{3}{4}°$, the angular motion of the magnet corresponding to a change of one division of scale reading is found to be 4′. 30″·9.

The variation of vertical force, in terms of the whole vertical force, producing angular motion of the magnet corresponding to change of one division of scale reading = Cotan. dip $\times \left(\frac{T'}{T}\right)^2 \times$ value of one division in terms of radius, in which T' is the time of vibration of the magnet in the horizontal plane, and T that in the vertical plane. From January 1 to May 31, assuming $T' = 17^s·255$, $T = 16^s·157$, and dip = 67°. 35′, the change of vertical force corresponding to change of one division of scale reading was found to be 0·000618; from June 1 to December 31, with the same value for T', and assuming $T = 15^s·584$, and dip = 67°. $34\frac{1}{4}$′, it was found to be 0·000664. These values have been severally used during the periods mentioned for conversion of the observed scale readings into parts of the whole vertical force.

Remarking that the time of vibration of the vertical force magnet is about 16 seconds, the method of observing is precisely similar to that described for the horizontal force magnet, and the hours of observation are the same. The wire in the fixed telescope is here horizontal, and as the magnet oscillates the divisions of the scale are seen to pass upwards and downwards in the field of view.

In the same way as described for the horizontal force magnet a thermometer is provided whose bulb projects into the interior of the magnet box. Readings are taken usually at 0^h, 1^h, 2^h, 3^h, 9^h, 21^h, 22^h, and 23^h. Its index error is insignificant.

The photographic register of the movements of the vertical force magnet is made on a cylinder of the same size as that used for declination and horizontal force, driven also by chronometer movement. The cylinder is here placed vertical instead of horizontal, and opportunity is taken to register on the same cylinder the variations of the barometer. The slit is horizontal, and other arrangements are generally similar to those already described for declination and horizontal force. The concave mirror carried by the magnet is 4 inches in diameter, and the slit is distant from it about 22 inches, being placed a little out of the straight line joining the mirror and the registering cylinder. There is a slight deviation in the further optical

arrangements. Instead of a reflecting prism (as for declination and horizontal force) the converging horizontal beam from the concave mirror falls on a system of plano-convex cylindrical lenses, placed in front of the cylinder, with their axes parallel to that of the cylinder. The trace is made on the western side of the cylinder, the position of the magnet being so adjusted that the spot of light shall fall also on the lower part of the sheet. An invariable base line is photographed, and the record is interrupted at each hour by the clock, and occasionally by the observer, for establishment of time scale, in the same way as for the other magnets. The length of the time scale is the same as that for the other magnetic registers.

The scale for measure of ordinates of the photographic curve is determined as follows:—The distance from the concave mirror to the surface of the registering cylinder is 100·2 inches. But the double of this measure, or 200·4 inches, is the distance that determines the extent of motion on the cylinder of the spot of light, which, in inches, for a change of 0·01 part of the whole vertical force, will therefore be $= 200{\cdot}4 \times \tan.\ \text{dip} \times \left(\frac{T}{T'}\right)^2 \times 0{\cdot}01$. Using the values of T, T′, and of dip, before given (page *xx*), the movement of the spot of light on the cylinder for a change of 0·01 of vertical force is thus found to be, for the period January 1 to May 31, 4·258 inches, and for the period June 1 to December 31, 3·959 inches, and with these units the scales for measure of the curve ordinates were constructed. Base line values are then determined, and written on the sheets, exactly in the same way as was described for horizontal force.

In regard to the temperature correction of the vertical force magnet, it is only necessary here to say that, according to a series of experiments made at the same time as, and in a similar manner to those for the horizontal force magnet (page *xviii*), it appeared that an increase of 1° of temperature (Fahrenheit) produced an apparent increase of ·000880 of the whole vertical force. This is an amount of change not only much larger than has ever been before found, but it is also one which does not follow the usual law of increase of temperature producing loss of magnetic power. Yet since the effect produced is that due to the action of temperature on the various parts of the mounting of the magnet as well as on the magnet itself, the result should be superior to those found by action on the magnet alone, as in all former experiments. There would appear, therefore, to be no doubt of its accuracy in the actual case. And it is easy to see that an instrument, subjected to the effects of gravity working differentially on its two ends, is liable to great changes depending on temperature which have no connection with magnetism. For instance, if the point at which the magnet is grasped by its carrier is not absolutely coincident with its centre of gravity, a sensible change in the space intervening between the grasping point and the centre of gravity may be

produced by a small change of temperature, and a disturbance of equilibrium and a great change of apparent magnetic position will follow. In practice a nearly uniform temperature is as far as possible maintained.

DIP INSTRUMENT.—The instrument with which the observations of magnetic dip have been made during the year 1881 is that which is known as Airy's instrument. It is mounted on a stone block of wood in the Magnetic Office No. 7. The plan of the instrument was arranged by Sir G. B. Airy so that the points of the needles should be viewed by microscopes, and if necessary observed whilst the needles were in a state of vibration, that there should be power of employing needles of different lengths, and that the field of view of each microscope should be illuminated from the side opposite to the observer, in such way that the needle point should form a dark image in the bright field.

The instrument is adapted to the observation of needles of 9 inches, 6 inches, and 3 inches in length. The main portion of the instrument, that in which the needle under observation is placed, consists of a square box made of gun metal (carefully selected to ensure freedom from iron), with back and front of glass. Six microscopes, so planted as to command the points of the three different lengths of needles, are attached to a horizontal axis which allows them to be turned round in the vertical plane so as to follow the points of the needles in the different positions which in observation they take up. The object glasses and field glasses of the microscopes are within the front glass plate, their eye glasses being outside, and turning with them on the same axis. Upon the plane side of each field glass (the side next the object glass and on which the image of the needle point is formed) a scale is etched. And on the inner side of the front glass plate is etched the graduated circle, divided to 10′, and read by two verniers to 10″. The verniers (thin plates of metal, with notches instead of lines, being thus adapted to transmitted light) are carried by the horizontal axis, inside of the front glass plate, their reading lenses, attached to the same axis, being outside. Proper clamp with slow motion is provided. The microscopes and verniers are illuminated by one gas lamp, the light from which falling on eight corresponding prisms is thereby directed to each separate microscope and vernier. The prisms are carried behind the back glass plate on a circular frame in such way that, on reversion of the instrument in azimuth, the whole set of prisms can at one motion of the frame be shifted so as to bring each one again opposite to its proper microscope or vernier.

The whole of the apparatus is planted upon a circular horizontal plate, admitting of rotation in azimuth: a graduated circle near the circumference of the plate is read by two fixed verniers.

A brass zenith point needle, having points corresponding in position to the three different lengths of dip needles, is used to determine the zenith point for each particular length of needle.

The instrument carries two levels, one parallel to the plane of the vertical circle, the other at right angles to that plane, by means of which the instrument is from time to time adjusted in level. The readings of the first-mentioned level are also regularly employed to correct the apparent value of dip for any small outstanding error of level: the correction seldom exceeds a very few seconds.

The needles in regular use are of the ordinary construction, they are two 9-inch needles, B_1 and B_2, two 6-inch needles, C_1 and C_2, and two 3-inch needles, D_1 and D_2.

During the year 1881 the Naylor equatoreal occupied the same position in the South Ground as in the year 1880. Its proximity to the Dip and Deflexion instruments has, however, been shown (*see* Introduction, 1880, p. *ci.*) to exercise no appreciable influence on the indications of these instruments.

DEFLEXION INSTRUMENT.—The observations of deflexion of a magnet in combination with observations of vibration of the deflecting magnet, for determination of the absolute intensity of magnetism, are made with a unifilar instrument, which, with the exception of some slight modification of the mechanical arrangements, is similar to those issued from the Kew Observatory. It is mounted on a block of wood in the Magnetic Office No. 7, on the south side of the Dip instrument.

The deflected magnet, whose use is merely to ascertain the proportion which the power of the deflecting magnet at a given distance bears to the power of terrestrial magnetism, is 3 inches long, and carries a small plane mirror, to which is directed a telescope fixed to and rotating with the frame that carries also the suspension piece of the deflected magnet: a scale fixed to the telescope is seen by reflexion at the plane mirror. The deflecting magnet is a hollow cylinder 4 inches long, containing in its internal tube a collimator, by means of which in another apparatus its time of vibration is observed. In observations of deflexion the deflecting magnet is placed on the transverse deflection rod, carried by the rotating frame at the distances 1·0 foot and 1·3 foot of the engraved scale from the deflected magnet, and with one end towards the deflected magnet. Observations are made at the two distances mentioned, with the deflecting magnet both east and west of the deflected magnet, and also with its poles in reversed positions. The fixed horizontal circle is 10 inches in diameter: it is graduated to 10′, and read by two verniers to 10″.

It will be convenient in this case to include with the description of the instrument an account of the method of reduction employed, in which the Kew precepts and generally the Kew notation are followed. Previous to the establishment of the instrument at the Royal Observatory the values of the various instrumental constants, as determined at the Kew Observatory, were kindly communicated by Professor Balfour Stewart, and have been since used in the reduction of all observations made with the instrument at Greenwich.

The instrumental constants as thus furnished are as follows:—

The increase in the magnetic moment of the deflecting magnet produced by the inducing action of a magnetic force equal to unity of the English system of absolute measurement $= \mu = 0{\cdot}00015587$.

The correction for decrease of the magnetic moment of the deflecting magnet required in order to reduce to the temperature 35° Fahrenheit $= q = 0{\cdot}00013126\ (t - 35) + 0{\cdot}000000259\ (t - 35)^2$: t representing the temperature at which the observation is made.

Moment of inertia of the deflecting magnet $= K$. At temperature 30°, log. $K = 0{\cdot}66643$: at temperature $90° = 0{\cdot}66679$.

The distance on the deflection rod from 1ft·0 east to 1ft·0 west of the engraved scale, at temperature 62°, is too long by 0·0034 inch, and the distance from 1ft·3 east to 1ft·3 west is too long by 0·0053 inch.

The adopted value of K was confirmed in the year 1878 by a new and entirely independent determination made at the Royal Observatory, giving log. K at temperature $30° = 0{\cdot}66727$.

If, in the deflection observation, r = apparent distance of centre of deflecting magnet from deflected magnet, corrected for scale error and temperature (taking expansion of scale for $1° = {\cdot}00001$), and u = observed angle of deflexion, then putting $A_1 = \frac{1}{2}\ r^3 \sin. u \left\{1 + \frac{2\mu}{r^3} + q\right\}$, in which $r = 1{\cdot}0$ foot, and A_2 = corresponding expression for $r = 1{\cdot}3$ foot; $P = \frac{A_1 - A_2}{A_1 - \frac{A_2}{(1\cdot3)^2}}$; but this is not convenient for logarithmic computation, especially as the logarithms of A_1 and A_2 are, in the calculation, first obtained. The difference between A_1 and A_2 being small, P may be taken equal to $(\text{Log. } A_1 - \text{Log. } A_2)\ \frac{1\cdot69}{(1\cdot69 - 1)\text{ modulus}} = (\text{Log. } A_1 - \text{Log. } A_2) \times 5{\cdot}64$. A mean value of P is adopted from various observations; then m being the magnetic moment of the deflecting magnet, and X the Horizontal component of the Earth's magnetic force, $\frac{m}{X} = A_1 \times \left(1 - \frac{P}{1}\right)$ from observation at distance 1·0 foot, or $= A_2 \times \left(1 - \frac{P}{1\cdot69}\right)$ from that at distance 1·3 foot. The mean of these is adopted for the true value of $\frac{m}{X}$.

For determination, from the observed vibrations, of the value of mX, let T_1 = time of vibration of the deflecting magnet corrected for rate and arc of vibration, then $T^2 = T_1^2 \left\{1 + \frac{H}{F} + \mu\frac{X}{m} - q\right\}$, in which $\frac{H}{F}$ is the ratio of the torsion force of the suspension thread of the deflecting magnet to the earth's directive force. And $mX = \frac{\pi^2 K}{T^2}$. The adopted time of vibration is the mean of 100 vibrations observed immediately before, and 100 observed immediately after the observations of deflexion.

From the combination of the values of $\frac{m}{X}$ and mX, m and X are immediately found. The computation is made with reference to English measure, taking as units the foot and grain, but it is desirable to express X also in metric measure. If the English foot be supposed equal to α times the millimètre and the grain equal to β times the milligramme, then for reduction to metric measure $\frac{m}{X}$ and mX must be multiplied by α^3 and $\alpha^2\beta$ respectively, or X must be multiplied by $\sqrt{\frac{\beta}{\alpha}}$. Taking the mètre as equal to 39·37079 inches, and the gramme as equal to 15·43249 grains, the factor by which X is to be multiplied in order to obtain X in metric measure is $0{\cdot}46108 = \frac{1}{2{\cdot}1689}$. The values of X in metric measures thus derived from those in English measure are given in the proper table. Values of X in terms of the centimètre and gramme, known as the C.G.S. unit (centimètre-gramme-second unit), are readily obtained by dividing those referred to the millimètre and milligramme by 10.

EARTH CURRENT APPARATUS.—For observation of the spontaneous galvanic currents which in some measure are almost always discoverable in the earth, and which are occasionally very powerful, two insulated wires having earth connexions at Angerstein Wharf (on the bank of the River Thames near Charlton) and Lady Well for one circuit; and at the Morden College end of the Blackheath Tunnel and the North Kent East Junction of the South-Eastern Railway for the other circuit, have been employed. The connecting wires pass from the Royal Observatory to the Greenwich Railway Station and thence, by kind permission of the Directors of the South-Eastern Railway Company, along the lines of the South-Eastern Railway to the respective earths, in each case a copper plate. The direct distance between the earth plates of the Angerstein Wharf—Lady Well circuit is 3 miles, and the azimuth of the line, reckoning from magnetic north towards east, 50°; in the Blackheath—North Kent East circuit the direct distance is $2\frac{1}{2}$ miles, and the azimuth, from magnetic north towards west, 46°. The actual lengths of wire in the circuitous courses which the wires necessarily take in order to reach the Observatory registering apparatus are about $7\frac{1}{2}$ miles and 5 miles respectively. The identity of the four branches is tested from time to time as appears necessary. The Lady Well and North Kent East branches were not employed in the first part of the year 1881, the Angerstein Wharf and Blackheath branches, connected to earth at the Royal Observatory, being alone used until June 4. The registering apparatus was then dismantled for the purpose of making a change in the apparatus for photographic registration. On recommencing registration in November, the complete circuits, Angerstein Wharf—Lady Well and Blackheath—North Kent East, were again employed.

In each circuit at the Royal Observatory there is placed a horizontal galvanometer, having its magnet suspended by a hair. Each galvanometer coils contains 150 turns of No. 29 copper wire, or the double coil of each instrument consists of 300 turns of wire. For information in regard to the photographic arrangements as existing before the dismantling of the apparatus on June 4, see the Introduction for 1880. The following is a description of the improved arrangement brought into operation in November. The galvanometers are placed on opposite sides of the registering cylinder, which is of course horizontal. One galvanometer stands towards one end of the cylinder, and the other towards the other end, and each carries, on a light stalk extending downwards from its magnet, a small plane mirror. Immediately above the cylinder are placed two long reflecting prisms which, except that they are each but half the length of the cylinder, and are placed end to end, are generally similar to those used for magnetic declination and horizontal force, the front convex surface facing opposite ways, each one towards the mirror of its respective galvanometer. In each case the light of a gas lamp, passing through a vertical slit and a vertical cylindrical lens, falls upon the galvanometer mirror, which reflects the converging beam to the convex surface of the reflecting prism, by whose action it is made to form on the paper on the cylinder a small spot of light; thus all the azimuthal motions of the galvanometer magnet are registered. The extent of trace for each galvanometer is thus confined to half the length of the cylinder, which is of the same size as those used for the magnetic registers. The arrangements for turning the cylinder, automatically determining the time scale, and forming an invariable base line are similar to those which have been before described. When the traces on the paper are developed the parts of the registers which appear in juxtaposition correspond, as for declination and horizontal force, to the same Greenwich time, and the scale of time is of the same length as for the magnetic registers.

§ 5. *Magnetic Reductions.*

The results given in the Magnetic Section refer in general to the astronomical day.

Before proceeding to discuss the photographic records of magnetic declination, horizontal force, and vertical force, they were divided into two groups, one including all days on which the traces showed no particular disturbance, and which therefore were suitable for the determination of diurnal inequality: the other comprising days of unusual and violent disturbance, when the traces were so irregular that it appeared impossible to treat them except by the exhibition of every motion of each magnet through the day. Following the principle of separation hitherto adopted, there are three days in the year 1881 which have been classed as days of great

disturbance, January 31 and September 12 and 13. There were no days of lesser disturbance requiring distinct mention.

Separating the days of great disturbance, the photographic sheets for the remaining quiet days (excepting January 7 for declination and horizontal force, and April 24 and October 20 for vertical force, when the photographic process failed) were thus treated. Through each photographic trace a pencil line was drawn representing the general form of the curve, without its petty irregularities. The ordinates of these pencil curves were then measured, with the proper pasteboard scales, at every hour, the measures being entered in a form having double argument, the vertical argument ranging through the 24 hours of the astronomical day, and the horizontal argument through the days of a calendar month, the means of the numbers standing in the vertical columns giving the mean daily value of the element, and the means of the numbers in the horizontal columns the mean monthly value at each hour of the day.

The temperature of the horizontal and vertical force magnetometers was maintained so nearly uniform through each day that the final determination of the diurnal inequalities of horizontal and vertical force should possess great exactitude, although in regard to vertical force the magnitude of the temperature co-efficient introduces an element of some uncertainty. It was not possible under the circumstances to maintain similar uniformity of temperature through all the seasons. Following the principle adopted in recent years, the results are given uncorrected for temperature; corresponding tables of mean temperature being in all cases added. It is deemed best that in the yearly volumes the results should be thus given, as more easily admitting of independent examination. When, as is done from time to time, the results for series of years are collected for general discussion, the temperature corrections are duly taken into account.

In regard to the measurement of ordinates on disturbed days, it is only necessary to explain that the assistant charged with the translation of the curve ordinates into numbers, remarking the salient points of the curve, or the points which if connected by straight lines would produce a polygon not sensibly differing from the photographic curve, applies to each of these the scale proper for the element under consideration: its position on the time-scale determines the time, and the reading of the scale for the point of the photographic curve gives the quantity which is to be applied to the value of the new base-line; the ordinate reading so formed is printed in the tables without alteration, and, as regards horizontal and vertical force, is not corrected for temperature. The temperatures referring to the measures of horizontal and vertical force on days of disturbance are given for the ordinary hours of observation on the right-hand page of the section.

The variations of declination are given in the sexagesimal division of the circle.

and those of horizontal and vertical force in terms of the whole horizontal and vertical forces respectively. They are also expressed in terms of Gauss's magnetic unit, as referred to the metrical system of the millimètre-milligramme-second.

The factors for conversion from the former to the latter system of measures are as follows:—

For variation of declination, expressed in minutes, the factor is

$$\text{H. F. metrical} \times \sin 1' = 1{\cdot}805 \times \sin 1' = 0{\cdot}0005251.$$

For horizontal force

$$\text{Variation of H. F. metrical} = \frac{\text{H. F. metrical}}{\text{Former H. F.}} \times \text{former variation} = 1{\cdot}805 \times \text{former variation},$$

the former H. F. being = 1.

For vertical force

$$\text{Variation of V. F. metrical} = \frac{\text{V. F. metrical}}{\text{Former V. F.}} \times \text{former variation.}$$

The former V. F. = 1, but the V. F. metrical = H. F. metrical × tan dip, hence, taking dip = $67^\circ.\,34\frac{1}{2}'$,

$$\begin{aligned}\text{Variation of V. F. metrical} &= 1{\cdot}805 \times \tan 67^\circ.\,34\tfrac{1}{2}' \times \text{former variation}\\ &= 4{\cdot}3738 \times \text{former variation.}\end{aligned}$$

The values given in Tables III., VIII., and XIII. have also been converted into metrical values.

The measures as referred to the metrical unit (millimètre-milligramme-second) are convertible into measures on the centimètre-gramme-second (C. G .S.) system by dividing by 10.

In the Tables of magnetic dip, the result of each separate observation of dip with each of the six needles in ordinary use is given, and also the concluded monthly and yearly values for each needle.

The results of the observations for absolute measure of horizontal force require no special remark, the method of reduction and all necessary explanation having been given with the description of the instrument.

No discussion of earth current records is contained in the present volume.

§ 6. *Meteorological Instruments.*

STANDARD BAROMETER.—The standard barometer, mounted in 1840 on the southern wall of the western arm of the upper magnet room, is Newman No. 64. Its tube is $0^{\text{in}}{\cdot}565$ in diameter, and the depression of the mercury due to capillary action is $0^{\text{in}}{\cdot}002$, but no correction is applied on this account. The cistern is of glass, and the graduated scale and attached rod are of brass; at its lower end the rod terminates in a point of ivory, which in observation is made just to meet the reflected

image of the point as seen in the mercury. The scale is divided to $0^{in}\cdot05$, subdivided by vernier to $0^{in}\cdot002$.

The readings of this barometer until 1866 August 20 are considered to be coincident with those of the Royal Society's flint-glass standard barometer. It then became necessary to remove the sliding rod, for repair of its slow motion screw, which was completed on August 30. Before the removal of the rod the barometer had been compared with three other barometers, one of which, during repair of the rod, was used for the daily readings. After restoration of the rod comparison was again made with the same three barometers with the result that (all three auxiliary barometers giving accordant results) the readings of the standard, in its new state, required a correction of $-0^{in}\cdot006$, which correction has been applied to every observation, commencing on 1866 August 30.

An elaborate comparison of the standard barometers of the Greenwich and Kew Observatories, made, under the direction of the Kew Committee, by Mr. Whipple, Superintendent of the Kew Observatory, in the spring of the year 1877, showed that the difference between the two barometers (after applying to the Greenwich barometer readings the correction $-0^{in}\cdot006$) did not exceed $0^{in}\cdot001$. (*Proceedings of the Royal Society*, vol. 27, page 76.)

The height of the barometer cistern above the mean level of the sea is 159 feet, being $5^{ft}\ 2^{in}$ above Mr. Lloyd's reference mark in the then transit room, now the Astronomer Royal's official room (*Philosophical Transactions*, 1831).

The barometer is usually read at 21^h, 0^h, 3^h, 9^h (astronomical). Each reading is corrected by application of the index correction above mentioned, and reduced to the temperature 32° by means of Table II. of the "Report of the Committee of Physics" of the Royal Society. The readings thus found are used to determine the value of the instrumental base line on the photographic record.

PHOTOGRAPHIC BAROMETER.—The barometric record is made on the same cylinder as is used for magnetic vertical force, the register being arranged to fall on the upper half of the cylinder, on its eastern side. A syphon barometer fixed to the northern wall of the Magnetic Basement is employed, the bore of the upper and lower extremities of the tube being about 1·1 inch. A metallic float is partly supported by a counterpoise acting on a light lever, leaving a definite part of its weight to be supported by the mercury. The lever carries at its other end a vertical plate of blackened mica, having a small horizontal slit, whose distance from the fulcrum is about eight times that of the point of connexion with the float, and whose vertical movement is therefore about four times that of the ordinary barometric column. The light of a gas lamp, passing through this slit and falling on a cylindrical lens, forms a spot of light on the paper. The barometer can, by screw action, be raised or lowered so as to keep the photographic trace in a convenient part of the sheet.

An invariable base line is traced on the sheet, and the record is interrupted at each hour by the clock and occasionally by the observer in the same way as for the magnetic registers. The length of the time scale is also the same.

The barometric scale is determined by experimentally comparing the measured movement on the paper with the observed movement of the standard barometer; one inch of barometric movement is thus found = $4^{\text{in}}\cdot39$ on the paper. Ordinates measured for the times of observation of the standard barometer, combined with the corrected readings of the standard barometer, give apparent values of the invariable base line, from which mean values for each day are formed; these are written on the sheets and new base lines drawn, as for the magnetic registers.

As regards the effect of temperature, it will be understood from the construction of the apparatus that the photographic record is influenced only by the expansion of the column of mercury (about 4 inches in length) in the lower tube of the barometer, and from this circumstance, in combination with the near uniformity of temperature in the basement, no appreciable differential effect is produced on the photographic register.

DRY AND WET BULB THERMOMETERS.—The dry and wet bulb thermometers and maximum and minimum self-registering thermometers, both dry and wet, are mounted on a revolving frame planned by Sir G. B. Airy. A vertical axis fixed in the ground, in a position about 35 feet south of the south-west angle of the Magnetic Observatory, carries the frame, which consists of a horizontal board as base, of a vertical board projecting upwards from it connected with one edge of the horizontal board, and of two parallel inclined boards (separated about 3 inches) connected at the top with the vertical board and at the bottom with the other edge of the horizontal board: the outer inclined board is covered with zinc, and the air passes freely between all the boards. The dry and wet bulb thermometers are mounted near the centre of the vertical board, with their bulbs about 4 feet from the ground; the maximum and minimum thermometers for air temperature are placed towards one side of the vertical board, and those for evaporation temperature towards the other side, with their bulbs at about the same level as those of the dry and wet bulb thermometers. A small roof projecting from the frame protects the thermometers from rain. The frame is turned in azimuth as necessary to keep the inclined side always towards the sun.

The corrections to be applied to all thermometers in ordinary use are determined from time to time as seems necessary, usually once each year, by comparison with the standard thermometer, No. 515, kindly supplied to the Royal Observatory by the Kew Committee of the Royal Society.

The dry and wet bulb thermometers are Negretti and Zambra, Nos. 45354 and 45355 respectively. They require no correction.

The self-registering thermometers for temperature of air and evaporation are all by Negretti and Zambra. The maximum thermometers are on Negretti and Zambra's principle, the minimum thermometers are of Rutherford's construction. To the readings of No. 8527 for maximum temperature of the air has been applied a correction of $-0^{\circ}\cdot 9$; those of No. 4386 for minimum temperature of the air required no correction. The readings of No. 44285 for maximum temperature of evaporation received until April 16 no correction below 55°, and a correction of $-0^{\circ}\cdot 1$ above 55°; from April 17, a correction of $-0^{\circ}\cdot 4$ has been applied to all readings. The readings of No. 3627 for minimum temperature of evaporation, until April 16, have been corrected by $+0^{\circ}\cdot 9$; and from April 17, by $+1^{\circ}\cdot 2$.

The dry and wet bulb thermometers are usually read at 21^h, 0^h, 3^h, 9^h (astronomical). Readings of the maximum and minimum thermometers are usually taken at 21^h and 9^h. Those of the dry and wet bulb thermometers are employed to correct the indications of the photographic dry and wet bulb thermometers.

PHOTOGRAPHIC DRY AND WET BULB THERMOMETERS.—About 28 feet south-south-east of the south-east angle of the Magnetic Observatory, and about 25 feet east-north-east of the stand carrying the thermometers for eye-observation already described, is an open shed, 10 ft. 6 in. square, standing upon posts 8 feet high, under which are placed the photographic thermometers, the dry-bulb towards the east and the wet-bulb towards the west. Their bulbs are 8 inches in length and 0·4 inch internal bore, and their centres are about 4 feet above the ground. A registering cylinder of ebonite, 10 inches long and 19 inches in circumference, is placed with its axis vertical between the stems of the two thermometers. The registers are made simultaneously on opposite sides of the cylinder, and to avoid any accidental overlapping of the two registers the cylinder is made to revolve once in about 52 hours. The thermometer frames are covered by metal plates having longitudinal slits, so that light can pass through the slit only above the surface of the mercury. At each degree a fine cross wire is placed, thicker at the decades of degrees, and also at 32°, 52°, and 72°. A gas lamp is placed about 9 inches from each thermometer (east of the dry-bulb and west of the wet-bulb), and in each case the light, condensed by a cylindrical lens with axis vertical, shines through the tube above the mercury, and forms a well-defined line of light upon the paper. As the cylinder revolves horizontally under the light passing through the thermometer tube, the paper thus receives a broad sheet of photographic trace, whose breadth, in the direction of the axis of the cylinder, varies with the varying height of the mercury in the thermometer tube. When the sheet is developed the whole of that part of the paper which in each case passed the slit above the mercury will show photographic trace, with thin white lines corresponding to the degrees, the lower part of the paper remaining white; thus the boundary of the photographic trace indicates the varying

temperature. The time scale is determined by interruption of the traces made by the observer at registered times. The length of 24 hours on each of the thermometer traces is about 9 inches.

RADIATION THERMOMETERS.—During the year 1881 the radiation thermometers were exposed on the grass south of the magnetic offices, in what is known as the South Ground. The thermometer for solar radiation is a self-registering mercurial maximum thermometer by Negretti and Zambra, No. 38592; its bulb is blackened, and the thermometer is enclosed in a glass sphere from which the air has been exhausted. The thermometer for radiation to the sky is a self-registering spirit minimum thermometer of Rutherford's construction, by Horne and Thornthwaite, No. 3120. The thermometers are laid on short grass; they require no correction for index error.

EARTH THERMOMETERS.—These thermometers were made by Adie, of Edinburgh, under the superintendence of Professor J. D. Forbes. They are placed at the north-west corner of the photographic thermometer shed.

The thermometers are four in number, placed in one hole in the ground, the diameter of which in its upper half is 1 foot and in its lower half about 6 inches, each thermometer being attached in its whole length to a slender piece of wood. The thermometer No. 1 was dropped into the hole to such a depth that the centre of its bulb was 24 French feet (25·6 English feet) below the surface, then dry sand was poured in till the hole was filled to nearly half its height. Then No. 2 was dropped in till the centre of its bulb was 12 French feet below the surface; Nos. 3 and 4 till the centres of their bulbs were respectively 6 and 3 French feet below the surface; and the hole was then completely filled with dry sand. The upper parts of the tubes carrying the scales were left projecting above the surface; No. 1 by 27·5 inches, No. 2 by 28·0 inches, No. 3 by 30·0 inches, and No. 4 by 32·0 inches. Of these lengths, 8·5, 10·0, 11·0, and 14·5 inches respectively are in each case tube with narrow bore. The length of 1° on the scales is 1·9 inch, 1·1 inch, 0·9 inch, and 0·5 inch in each case respectively. The ranges of the scales are for No. 1, 46°·0 to 55°·5; No. 2, 43°·0 to 58°·0; No. 3, 44°·0 to 62°·0; and for No. 4, 37°·0 to 68°·0.

The bulbs of the thermometers are cylindrical, 10 or 12 inches long, and 2 or 3 inches in diameter. The bore of the principal part of each tube, from the bulb to the graduated scale, is very small, in that part to which the scale is attached it is larger; the fluid in the tubes is alcohol tinged red; the scales are of opal glass.

In consequence of the ranges of scale having in previous years been found insufficient, fluid has at times been removed from or added to the thermometers as necessary, proper corresponding alteration being made in the positions of the

attached scales. Information in regard to these changes will be found in previous Introductions.

The parts of the tubes above the ground are protected by a small wooden hut fixed to the ground; the sides of the hut are perforated with numerous holes, and it has a double roof; in the north face is a plate of glass, through which the readings are taken. Within the hut are two small thermometers, one, No. 5, with bulb one inch in the ground, another, No. 6, whose bulb is freely exposed in the centre of the hut.

These thermometers are read every day at noon, and the readings are given without correction. The index errors of Nos. 1, 2, 3, and 4 are unknown; No. 5 appears to read too high by 0°·2, and No. 6 by 0°·4.

OSLER'S ANEMOMETER. — This self-registering anemometer, devised by A. Follett Osler, is fixed above the north-western turret of the ancient part of the Observatory. For direction of the wind a large vane, from which a vertical shaft proceeds down to the registering table within the turret, gives motion, by a pinion fixed at its lower end, to a rack-work carrying a pencil. A collar on the vane shaft bears upon anti-friction rollers, running in a cup of oil, rendering the vane very sensitive to changes of direction in light winds. The pencil marks a paper fixed to a board moved horizontally and uniformly by a clock, in a direction transverse to that of the motion of the pencil. The paper carries lines corresponding to the positions of N., E., S., and W. of the vane, with transversal hour-lines. The vane is 60 feet above the adjacent ground, and 215 feet above the mean level of the sea. A fixed mark on the north-eastern turret, in a known azimuth, as determined by celestial observation, is used for examining at any time the position of the direction plate over the registering table, to which reference is made by means of a direction pointer when adjusting a new sheet on the travelling board.

For the pressure of the wind the construction is as follows. At a distance of 2 feet below the vane there is placed a circular pressure plate having an area of $1\frac{1}{3}$ square feet, or 192 square inches, which, moving with the vane, and being thereby kept directed towards the wind, acts against a combination of springs in such way that, with a light wind, slender springs are first brought into action, but, as the wind increases, stiffer springs come into play. For a detailed account of the arrangement adopted the reader is referred to the Introduction for the year 1866. A short flexible chain, fixed to a cross bar in connexion with the pressure plate, passing over a pulley in the upper part of the shaft, is then attached to a copper wire running down the centre of the shaft to the registering table, just before reaching which the wire communicates with a short length of silk cord, which, led round a pulley, gives horizontal motion to the arm carrying the pressure pencil. The scale for pressure, in lbs. on the square foot, is experimentally determined from

time to time as appears necessary: the pressure pencil is brought to zero by a light spiral spring.

A rain gauge of peculiar construction forms part of the apparatus: this is described under the heading "Rain Gauges."

A new sheet of paper is applied to the instrument every day at noon. The scale of time is equal in length to that of the magnetic registers.

ROBINSON'S ANEMOMETER.—This instrument, mounted above the small building on the roof of the Octagon Room, is constructed on the principle described by the late Dr. Robinson in the *Transactions of the Royal Irish Academy*, Vol. XXII. The revolving hemispherical cups are 56 feet above the adjacent ground, and 211 feet above the mean level of the sea. The motion is given by the pressure of the wind on four hemispherical cups, each 5 inches in diameter, the centre of each cup being 15 inches distant from the vertical axis of rotation. The foot of the axis is a hollow flat cone bearing upon a sharp cone, which rises up from the base of a cup of oil. An endless screw acts on a train of wheels furnished with indices for reading off the amount of motion of the air in miles, and a pinion on the axis of one of the wheels draws upwards a rack, to which is attached a rod passing down to the pencil, which marks the paper placed on the vertical revolving cylinder in the chamber below. A motion of the pencil upwards through a space of one inch represents horizontal motion of the air through 100 miles.

The cylinder is driven by a clock in the usual way, and makes one revolution in 24 hours. A new sheet of paper is applied every day at noon. The scale of time is equal in length to that of Osler's Anemometer and the magnetic registers.

It is assumed, in accordance with the experiments made by Dr. Robinson, that the horizontal motion of the air is three times the space described by the centres of the cups. To verify this conclusion experiments were made in the year 1860 in Greenwich Park with the anemometer then in use, not the same as that now employed. The instrument was fixed to the end of a horizontal arm, which was made to revolve round a vertical axis. For more detailed account of these experiments see the Introduction for 1880. With the arm revolving in the direction N., E., S., W., opposite to the direction of rotation of the cups, for movement of the instrument through one mile 1·15 was registered; with the arm revolving in the direction N., W., S., E., in the same direction as the rotation of the cups, 0·97 was registered. This was considered to confirm sufficiently the accuracy of the theory.

RAIN GAUGES.—During the year 1881 eight rain-gauges were employed, placed at different elevations above the ground, complete information in regard to which will be found at page (lxxi) of the Meteorological Section.

The gauge No. 1 forms part of the Osler Anemometer apparatus, and is self-registering, the record being made on the sheet on which the direction and pressure of the wind are recorded. The receiving surface is a rectangular opening 10 × 20 inches, equal to 200 square inches. The collected water passes into a vessel suspended by spiral springs, which lengthen as the water accumulates, until 0·25 inch is collected, the water then discharges itself by means of the following modification of the syphon. A vertical copper tube, open at both ends, is fixed in the receiver, with one end just projecting below the bottom. Over this tube there is loosely placed, in the receiver, a larger tube, closed at the top. The accumulating water, having risen to the top of the inner tube, begins to flow off into a small tumbling bucket, fixed in a globe placed underneath, and carried by the receiver. When full the bucket falls over, throwing the water into a small exit pipe at the lower part of the globe—the only outlet. The water filling the bore of the pipe creates a partial vacuum in the globe sufficient to cause the longer leg of the syphon to act, and the whole remaining contents of the receiver then run off, through the globe, to a waste pipe. The spiral springs at the same time shorten, and raise the receiver. The gradual descent of the water vessel as the rain falls, and the immediate ascent on discharge of the water, act upon a pencil, and cause a corresponding trace to be made on the paper fixed to the moving board of the anemometer. The rain scale on the paper was determined experimentally by passing a known quantity of water through the receiver. The continuous record thus gives complete information on the rate of the fall of rain.

Gauge No. 2 is a ten-inch circular gauge, placed close to gauge No. 1, its receiving surface being precisely at the same level. The gauge is read daily.

Gauges Nos. 3, 4, and 5 are eight-inch circular gauges, placed respectively on the roof of the Octagon Room, over the roof of the Magnetic Observatory, and on the roof of the Photographic Thermometer Shed. All are read daily.

Gauges Nos. 6, 7, and 8 are also eight-inch circular gauges, placed on the ground south of the Magnetic Observatory; No. 6 is the old daily gauge, No. 7 the old monthly gauge, and No. 8 an additional gauge brought into use in July 1881, as a check on the readings of Nos. 6 and 7, the monthly amounts collected by these gauges showing occasionally greater differences than seemed proper. All three gauges have been read daily since the beginning of July 1881.

The gauges are also read at midnight on the last day of each calendar month.

The action of the Crosley self-registering gauge, of which description will be found in the Introduction to 1880, became so unsatisfactory that the use of the gauge was discontinued in the year 1881.

ELECTROMETER.—The electricity of the atmosphere is collected by means of a Thomson self-recording electrometer, constructed by Mr. White of Glasgow.

For a very full description of the principle of the electrometer reference may be

made to Sir William Thomson's "Report on Electrometers and Electrostatic Measurements," contained in the *British Association Report* for the year 1867. It will be sufficient here to give a general description of the instrument which, with its registering apparatus, is planted in the Upper Magnet Room on the slate slab which carries the suspension pulleys of the Horizontal Force Magnet. A thin flat needle of aluminium, carrying immediately above it a small light mirror, is suspended, on the bifilar principle, by two silk fibres from an insulated support within a large Leyden jar. A little strong sulphuric acid is placed in the bottom of the jar, and from the lower side of the needle depends a platinum wire, kept stretched by a weight, which connects the needle with the sulphuric acid, that is with the inner coating of the jar. A positive charge of electricity being given to the needle and jar, this charge is easily maintained at a constant potential by means of a small electric machine or replenisher forming part of the instrument, and by which the charge can be either increased or decreased at pleasure. A gauge is provided for the purpose of indicating at any moment the amount of charge. The needle hangs within four insulated quadrants, which may be supposed to be formed by cutting a circular flat brass box into quarters, and then slightly separating them. The opposite quadrants are placed in metallic connexion.

The electricity of the atmosphere is collected by means of Sir William Thomson's water-dropping apparatus. For this purpose a rectangular cistern of copper, capable of holding above 30 gallons of water, is placed near the ceiling on the west side of the south arm of the Upper Magnet Room. The cistern rests on four pillars of glass, each one encircled and nearly completely enclosed by a glass vessel containing sulphuric acid. A pipe passing out from the cistern, through the south face of the building, extends about six feet into the atmosphere, the nozzle from which the water flows being about ten feet above the ground; the water passing out through a very small hole, and breaking almost immediately into drops, the cistern is brought to the same electrical potential as that point of the atmosphere, which potential is, by means of a connecting wire, communicated to one of the pairs of electrometer quadrants, the other pair being connected to earth. The varying atmospheric potential thus influences the motions of the included needle, causing it to be deflected from zero in one direction or the other, according as the atmospheric potential is greater or less than that of the earth, that is according as it is positive or negative as respects that of the earth.

The small mirror carried by the needle is used for the purpose of obtaining photographic record of its motions. The light of a gas-lamp, falling through a slit upon the mirror, is thence reflected, and by means of a plano-convex cylindrical lens is brought to a focus at the surface of a horizontal cylinder turned by clock-work. A brass cylinder was used until March 1881, since which time an ebonite cylinder, nearly 7 inches long and 16 inches in circumference, has been employed. A second fixed mirror, by means of the same gas-lamp, causes an invariable reference line to be traced round the cylinder. The actual zero is

found by cutting off the cistern communication, and placing the pairs of quadrants in metallic connexion with each other and with earth. The break of register at each hour is made by the driving-clock of the electrometer cylinder itself. Other photographic arrangements are generally similar to those which have been described for other instruments.

On June 7 the bifilar suspension of the needle gave way; the suspension threads were renewed on June 13. The excursion of the needle for a given potential would since seem to be somewhat greater than before.

The scale of time is equal in length to that of the magnetic registers.

Inconvenience is sometimes caused by cobwebs making connexion between the cistern or its pipe and the walls of the building, and in winter, interruptions occasionally occur owing to the freezing of the water in the exit pipe.

SUNSHINE INSTRUMENT.—This instrument, contrived by Mr. J. F. Campbell, and kindly given by him to the Royal Observatory, consists of a very accurately formed sphere of glass, nearly 4 inches in diameter, supported concentrically within a well turned hemispherical metal bowl in such a manner that the image of the sun, formed when the sun shines, falls always on the concave surface of the bowl. A strip of blackened millboard being fixed in the bowl, the sun, when shining, burns away the surface at the points at which the image successively falls, by which means the record of periods of sunshine is obtained. The strip is removed after sunset, and a new one fixed ready for the following day. The place of the meridian is marked on the strip before removing it from the bowl. A series of time scales, suitable for different periods of the year, having been prepared, the proper scale is selected and placed against the record, which is then easily transferred to a sheet of paper specially ruled with equal vertical spaces to represent hours, each sheet containing the record for one calendar month. The daily sums, and sums during each hour (reckoning from apparent noon) through the month are thus readily formed. The recorded durations are to be understood as indicating the amount of *bright* sunshine, no register being obtained when the sun shines faintly through fog or cloud, neither is any register usually obtained when the sun's altitude is less than 5°. The instrument is placed on a table upon the platform above the Magnetic Observatory.

June 29. 1883
At my costs during 9 years, these observations have been entered on my Time Scales. The meteorological department in 1882. I have adopted my system, and are publishing records for many stations in England..

OZONOMETER.—This apparatus is fixed on the south-west corner of the roof of the Photographic Thermometer shed, at a height of about 10 feet from the ground. The box in which the papers are exposed is of wood: it is about 8 inches square, blackened inside, and so constructed that there is free circulation of air through the box, without exposure of the paper to light. The papers exposed at 21^h, 3^h, and 9^h are collected respectively at 3^h, 9^h, and 21^h, and the degree of tint produced is compared with a scale of graduated tints, numbered from 0 to 10. The value of

Stokes and Leckie modified & rather spoiled the

9/185
simplicity of my invention, & increased the cost. Leckie profits. He buys glass spheres from Feil of Paris and sells them with elaborate Brass contrivances, which have to be made for each latitude. Mine serves all latitudes.

ozone for the civil day is determined by taking the degree of tint obtained at each hour of collection as proportional to the period of exposure. Thus to form the values for any given civil day, three-fourths of the value registered at 21^h, the values registered at 3^h and 9^h, and one-fourth of that registered at the following 21^h, are added together, the resulting sum (which appears in the tables of "Daily Results") being taken as the value referring to the civil day. The means of the 21^h, 3^h, and 9^h values, as observed, are also given for each month in the foot notes.

§ 7. *Meteorological Reductions.*

The results given in the Meteorological section refer in general to the civil day.

All results in regard to atmospheric pressure, temperature of air and of evaporation and deductions therefrom, and atmospheric electricity, are derived from the photographic records, excepting that the maximum and minimum values of air temperature are those given by eye-observation of the ordinary maximum and minimum thermometers. The hourly readings of the photographic traces for the elements mentioned are entered into a form having double argument, the horizontal argument ranging through the 24 hours of the civil day, and the vertical argument through the days of a calendar month. It should be mentioned that before measuring out the electrometer ordinates, a pencil line was first drawn through the trace to represent the general form of the curve in the way described for the magnetic registers (page *xxvii*), excepting that all days are included, no day being omitted on account of unusual electrical disturbance, it having been found difficult to decide on any limit of disturbance beyond which it would seem proper, as regards determination of diurnal inequality, to reject the results. The ordinates of the pencil curve, drawn as described, were measured by a scale of inches, calling the zero 10·00 to avoid negative values: the scale is thus arbitrary. Numbers greater than 10·00 indicate positive potential. Then, for all the photographic elements, the means of the numbers standing in the vertical columns of the monthly forms, into which the values are entered, give the mean monthly photographic values for each hour of the day, the means of the numbers in the horizontal columns giving the mean daily value.

To correct the photographic values of barometer and dry and wet bulb thermometer for small instrumental error, the means of the photographic readings at 21^h, 0^h, 3^h, and 9^h in each month are compared with the corresponding corrected mean readings of the standard barometer and standard dry and wet bulb thermometers, as given by eye-observation. A correction applicable to the photographic reading at each of these hours is thus obtained, and, by interpolation, corrections for the intermediate hours are found. The mean of the twenty-four hourly corrections in each month is adopted as the correction applicable to each mean daily value in the month. Thus mean hourly and mean daily values of the several elements are obtained for each month. The process of correction is equivalent to giving photographic indications in terms of corrected standard barometer, and in terms of the standard dry and wet bulb thermometers exposed on the free stand.

The mean daily temperature of the dew-point and degree of humidity are deduced from the mean daily temperatures of the air and evaporation by use of Glaisher's *Hygrometrical Tables*. The factors by which the dew-point given in these tables is calculated were found by Mr. Glaisher from the comparison of a great number of dew-point determinations obtained by use of Daniell's hygrometer, with simultaneous observations of dry and wet bulb thermometers, combining observations made at the Royal Observatory, Greenwich, with others made in India and at Toronto. The factors are given in the following table.

TABLE OF FACTORS by which the DIFFERENCE between the READINGS of the DRY-BULB and WET-BULB THERMOMETERS is to be MULTIPLIED in order to PRODUCE the CORRESPONDING DIFFERENCE between the DRY-BULB TEMPERATURE and that of the DEW-POINT.

Reading of Dry-bulb Thermometer.	Factor.	Reading of Dry-bulb Thermometer.	Factor.	Reading of Dry-bulb Thermometer.	Factor.	Reading of Dry-bulb Thermometer.	Factor.
° 10	8·78	° 33	3·01	° 56	1·94	° 79	1·69
11	8·78	34	2·77	57	1·92	80	1·68
12	8·78	35	2·60	58	1·90	81	1·68
13	8·77	36	2·50	59	1·89	82	1·67
14	8·76	37	2·42	60	1·88	83	1·67
15	8·75	38	2·36	61	1·87	84	1·66
16	8·70	39	2·32	62	1·86	85	1·65
17	8·62	40	2·29	63	1·85	86	1·65
18	8·50	41	2·26	64	1·83	87	1·64
19	8·34	42	2·23	65	1·82	88	1·64
20	8·14	43	2·20	66	1·81	89	1·63
21	7·88	44	2·18	67	1·80	90	1·63
22	7·60	45	2·16	68	1·79	91	1·62
23	7·28	46	2·14	69	1·78	92	1·62
24	6·92	47	2·12	70	1·77	93	1·61
25	6·53	48	2·10	71	1·76	94	1·60
26	6·08	49	2·08	72	1·75	95	1·60
27	5·61	50	2·06	73	1·74	96	1·59
28	5·12	51	2·04	74	1·73	97	1·59
29	4·63	52	2·02	75	1·72	98	1·58
30	4·15	53	2·00	76	1·71	99	1·58
31	3·70	54	1·98	77	1·70	100	1·57
32	3·32	55	1·96	78	1·69		

In the same way the mean hourly values of the dew-point and degree of humidity in each month (pages (lix) and (lx)) have been calculated from the corresponding mean hourly values of air and evaporation temperatures (pages (lviii) and (lix)).

The excess of the mean temperature of the air on each day above the average of 20 years, given in the "Daily Results," is found by comparing the numbers contained in column 6 with a table of average daily temperatures found by smoothing the accidental irregularities of the numbers given in Table LXXVII. of the "Reduction of Greenwich Meteorological Observations, 1847–1873," which are similarly deduced from photographic records. The smoothed numbers are given in the following table.

ADOPTED VALUES of MEAN TEMPERATURE of the AIR, deduced from TWENTY-FOUR HOURLY READINGS on each Day, for every Day of the Year, as obtained from the PHOTOGRAPHIC RECORDS for the Period 1849–1868.

Day of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	°	°	°	°	°	°	°	°	°	°	°	°
1	38·1	40·5	40·3	45·3	48·7	57·5	61·6	62·6	60·1	54·7	47·0	41·5
2	37·9	40·6	40·4	45·7	48·9	57·7	61·5	62·7	60·0	54·4	46·7	41·8
3	37·8	40·7	40·5	46·1	49·1	57·9	61·4	62·7	59·8	54·0	46·4	42·1
4	37·7	40·7	40·5	46·4	49·4	58·1	61·4	62·7	59·7	53·7	46·0	42·4
5	37·6	40·6	40·5	46·6	49·7	58·2	61·5	62·7	59·5	53·4	45·6	42·6
6	37·6	40·4	40·5	46·7	50·0	58·3	61·7	62·7	59·3	53·0	45·2	42·7
7	37·6	40·2	40·6	46·8	50·3	58·4	61·9	62·7	59·0	52·7	44·7	42·8
8	37·7	39·9	40·6	46·8	50·6	58·5	62·2	62·7	58·8	52·5	44·3	42·8
9	37·7	39·6	40·7	46·9	50·8	58·5	62·5	62·7	58·5	52·3	43·8	42·8
10	37·8	39·3	40·7	46·9	51·1	58·6	62·7	62·7	58·3	52·1	43·4	42·7
11	37·9	39·1	40·8	47·0	51·4	58·7	62·9	62·7	58·1	51·9	43·0	42·5
12	38·1	38·9	40·8	47·1	51·8	58·8	63·1	62·6	58·0	51·7	42·6	42·2
13	38·2	38·8	40·9	47·2	52·1	58·9	63·3	62·5	57·8	51·6	42·3	41·8
14	38·3	38·7	41·0	47·4	52·5	59·1	63·4	62·4	57·6	51·4	42·0	41·5
15	38·4	38·7	41·1	47·5	52·9	59·3	63·4	62·3	57·4	51·3	41·8	41·1
16	38·5	38·8	41·2	47·6	53·3	59·5	63·5	62·1	57·3	51·2	41·6	40·8
17	38·6	38·9	41·3	47·8	53·7	59·7	63·5	61·9	57·1	51·1	41·5	40·5
18	38·8	39·0	41·4	47·9	54·1	59·9	63·4	61·8	56·9	51·0	41·5	40·2
19	38·9	39·2	41·4	48·0	54·4	60·2	63·3	61·6	56·8	50·8	41·4	40·0
20	39·1	39·3	41·5	48·1	54·7	60·5	63·2	61·4	56·6	50·6	41·3	39·8
21	39·3	39·5	41·6	48·2	55·0	60·8	63·0	61·3	56·4	50·4	41·2	39·6
22	39·5	39·6	41·7	48·2	55·3	61·1	62·9	61·3	56·2	50·1	41·1	39·4
23	39·6	39·7	41·8	48·3	55·5	61·4	62·8	61·2	56·1	49·7	41·0	39·3
24	39·7	39·8	42·0	48·3	55·7	61·7	62·7	61·1	55·9	49·4	41·0	39·3
25	39·8	39·9	42·3	48·4	55·9	61·9	62·7	61·0	55·8	49·1	40·9	39·2
26	39·9	40·0	42·6	48·4	56·1	62·0	62·7	60·9	55·7	48·8	40·8	39·1
27	40·0	40·1	43·0	48·4	56·3	62·0	62·6	60·8	55·5	48·5	40·8	39·0
28	40·1	40·2	43·4	48·5	56·5	61·9	62·6	60·7	55·4	48·2	40·9	38·8
29	40·2		43·8	48·5	56·8	61·8	62·6	60·6	55·2	47·9	41·0	38·7
30	40·3		44·3	48·6	57·0	61·7	62·6	60·4	54·9	47·6	41·2	38·5
31	40·4		44·8		57·3		62·6	60·3		47·3		38·3
Means	38·7	39·7	41·5	47·5	53·1	59·8	62·6	61·9	57·5	51·0	42·7	40·8

The mean of the twelve monthly values is 49°·7.

The daily register of rain contained in column 18 is that recorded by the gauge No. 6, whose receiving surface is 5 inches above the ground. This gauge is usually read at 21ʰ and 9ʰ. The continuous record of Osler's self-registering gauge shows whether the amounts measured at 21ʰ are to be placed to the same, or to the preceding civil day; and in cases in which rain fell both before and after midnight, also gives the means of ascertaining the proper proportion of the 21ʰ amount which should be placed to each civil day. The number of days of rain given in the foot notes, and in the abstract tables, pages (lvii) and (lxxi), is formed from the records of this gauge. In this numeration only those days are counted on which the fall amounted to or exceeded $0^{in}\cdot005$.

The indications of electricity are derived from Thomson's Electrometer. On some days, not necessary to be specified, during interruption or failure of photographic registration, the results depend on eye observations.

No particular explanation of the anemometric results seems necessary. It may be understood generally that the greatest pressures usually occur in gusts of short duration.

The mean amount of cloud given in a foot note on the right-hand page, and in the abstract table, page (lvii), is the mean found from observations made usually at 21^h, 0^h, 3^h, and 9^h, of each day.

For understanding the divisions of time under the headings "Clouds and Weather" and "Electricity," the following remarks are necessary:—In regard to Clouds and Weather, the day is divided by columns into two parts (from midnight to noon, and from noon to midnight), and each of these parts is subdivided into two or three parts by colons (:). Thus, when there is a single colon in the first column, it denotes that the indications before it apply (roughly) to the interval from midnight to 6 A.M., and those following it to the interval from 6 A.M. to noon. When there are two colons in the first column, it is to be understood that the twelve hours are divided into three nearly equal parts of four hours each. And similarly for the second column. In regard to Electricity the results are included in one column; in this case the colons divide the whole period of 24 hours (midnight to midnight).

The notation employed for Clouds and Weather is as follows, it being understood that for clouds Howard's Nomenclature is used. The figure denotes the proportion of sky covered by cloud, an overcast sky being represented by 10.

a	denotes	*aurora borealis*	h	denotes	*haze*
ci	...	*cirrus*	slt-h	...	*slight haze*
ci-cu	...	*cirro-cumulus*	hl	...	*hail*
ci-s	...	*cirro-stratus*	l	...	*lightning*
cu	...	*cumulus*	li-cl	...	*light clouds*
cu-s	...	*cumulo-stratus*	lu-co	...	*lunar corona*
d	...	*dew*	lu-ha	...	*lunar halo*
hy-d	...	*heavy dew*	m	...	*mist*
f	...	*fog*	slt-m	...	*slight mist*
slt-f	...	*slight fog*	n	...	*nimbus*
tk-f	...	*thick fog*	p-cl	...	*partially cloudy*
fr	...	*frost*	r	...	*rain*
ho-fr	...	*hoar frost*	c-r	...	*continued rain*
g	...	*gale*	fr-r	...	*frozen rain*
hy-g	...	*heavy gale*	fq-r	...	*frequent rain*
glm	...	*gloom*	hy-r	...	*heavy rain*
gt-glm	...	*great gloom*	c-hy-r	...	*continued heavy rain*

m-r	denotes	*misty rain*	sc	denotes	*scud*
fq-m-r	...	*frequent misty rain*	li-sc	...	*light scud*
oc-m-r	...	*occasional misty rain*	sl	...	*sleet*
oc-r	...	*occasional rain*	sn	...	*snow*
sh-r	...	*shower of rain*	oc-sn	...	*occasional snow*
shs-r	...	*showers of rain*	slt-sn	...	*slight snow*
slt-r	...	*slight rain*	so-ha	...	*solar halo*
oc-slt-r	...	*occasional slight rain*	sq	...	*squall*
th-r	...	*thin rain*	sqs	...	*squalls*
fq-th-r	...	*frequent thin rain*	fq-sqs	...	*frequent squalls*
oc-th-r	...	*occasional thin rain*	hy-sqs	...	*heavy squalls*
hy-sh	...	*heavy shower*	fq-hy-sqs	...	*frequent heavy squalls*
slt-sh	...	*slight shower*	oc-sqs	...	*occasional squalls*
fq-shs	...	*frequent showers*	t	...	*thunder*
hy-shs	...	*heavy showers*	t-sm	...	*thunder storm*
fq-hy-shs	...	*frequent heavy showers*	th-cl	...	*thin clouds*
oc-hy-shs	...	*occasional heavy showers*	v	...	*variable*
li-shs	...	*light showers*	vv	...	*very variable*
oc-shs	...	*occasional showers*	w	...	*wind*
s	...	*stratus*	st-w	...	*strong wind*

The following is the notation employed for Electricity:—

N	denotes	*negative*	w	denotes	*weak*
P	...	*positive*	s	...	*strong*
m	...	*moderate*	v	...	*variable*

The duplication of the letter denotes intensity of the modification described, thus, s s, is very strong; v v, very variable. 0 indicates no electricity, and a dash "—" accidental failure of the apparatus.

The remaining columns in the tables of "Daily Results" seem to require no special remark; all necessary explanation regarding the results therein contained will be found in the notes at the foot of the left-hand page, or in the descriptions of the several instruments given in § 6.

In regard to the comparisons of the extremes and means, &c. of meteorological elements with average values, contained in the foot notes, it may be mentioned that the photographic barometric results are compared with the corresponding barometric results, 1854–1873, and the photographic thermometric results and deductions therefrom with the corresponding thermometric results, 1849–1868 (see "Reduction of Greenwich Meteorological Observations 1847–1873"). Other deductions, from eye observations, are compared with averages for the period 1841–1880.

The tables of Meteorological Abstracts following the tables of "Daily Results," and the Observations of Luminous Meteors, require no particular explanation. In general only special meteor showers are watched for, such as those of August and November. The observers of meteors in the year 1881 were Mr. Ellis, Mr. Nash, Mr. Greengrass, Mr. Hugo, Mr. Stafford, and Mr. Jeffery; their observations are distinguished by the initials E, N, G, H, S, and J respectively.

§ 8. *Details of the Photographic Process.*

The paper used in 1881 was that known as Whatman's royal, a paper not specially prepared for photographic purposes.

First Operation.—Preliminary Preparation of the Paper.

The chemical solutions used in this process are the following :—

(1.) Sixteen grains of iodide of potassium are dissolved in one ounce of distilled water.

(2.) Twenty-four grains of bromide of potassium are dissolved in one ounce of distilled water.

(3.) When the crystals are dissolved, the two solutions are mixed together, forming the bromo-iodising solution. The mixture will keep through any length of time. Immediately before use, it is filtered through filtering paper.

A quantity of the paper, sufficient for the consumption of several weeks, is treated in the following manner, sheet after sheet.

> The sheet of paper is pinned by its four corners to a horizontal board. Upon the paper, a sufficient quantity (about 50 minims, or $\frac{5}{48}$ of an ounce troy) of the bromo-iodising solution is applied, by pouring it upon the paper in front of a glass rod, which is then moved to and fro till the whole surface is uniformly wetted by the solution. Or, the solution may be evenly distributed by means of a camel-hair brush.

The paper thus prepared is allowed to remain in a horizontal position for a few minutes, and is then hung up to dry in the air; when dry, it is placed in a drawer, and may be kept through any length of time.

Second Operation.—Rendering the Paper sensitive to the Action of Light.

A solution of nitrate of silver is prepared by dissolving 50 grains of crystallized nitrate of silver in one ounce of distilled water. Since the magnetic basement has been used for photography, 15 minims of acetic acid have always been added to the solution.

Then the following operation is performed in a room illuminated by yellow light.

The paper is pinned upon a board somewhat smaller than itself, and by means of a glass rod its surface is wetted with 70 minims of the nitrate of silver solution. It is allowed to remain a short time in a horizontal position, and, if any part of the paper still shines from the presence of a part of the solution unabsorbed into its texture, the superfluous fluid is taken off by the application of blotting paper.

The paper, still damp, is immediately placed upon the cylinder, and is covered by the exterior glass tube, and the cylinder is mounted upon the revolving apparatus, to receive the spot of light formed by the mirror, which is carried by the magnet; or to receive the line of light passing through the thermometer tube.

Third Operation.—Development of the Photographic Trace.

When the paper is removed from the cylinder, it is placed as before upon a board, and a saturated solution of gallic acid, to which a few drops of aceto-nitrate of silver are occasionally added, is spread over the paper by means of a glass rod, and this action is continued until the trace is fully developed. The solutions are kept in the magnetic basement, and are always used at the temperature of that room. When the trace is well developed, the paper is placed in a vessel with water, and repeatedly washed with several changes of water; a brush being passed lightly over both sides of the paper to remove any crystalline deposit.

Fourth Operation.—Fixing the Photographic Trace.

The photograph is placed in a solution of hyposulphite of soda, made by dissolving four or five ounces of the hyposulphite in a pint of water; it is plunged completely in the liquid, and allowed to remain from one to two hours, until the yellow tint of the iodide of silver is removed. After this the sheet is washed repeatedly with water, allowed to remain immersed in water for 24 hours, and afterwards placed within folds of cotton cloths till nearly dry. Finally it is either ironed, or placed between sheets of blotting-paper and pressed.

Royal Observatory, Greenwich,
1882 December 19.

W. H. M. CHRISTIE.

ROYAL OBSERVATORY, GREENWICH.

RESULTS

OF

MAGNETICAL OBSERVATIONS.

1881.

ROYAL OBSERVATORY, GREENWICH.

REDUCTION

OF THE

MAGNETIC OBSERVATIONS

(EXCLUDING THE DAYS OF GREAT MAGNETIC DISTURBANCE).

1881.

TABLE I.—MEAN WESTERN DECLINATION of the MAGNET on each ASTRONOMICAL DAY, as deduced from the MEAN of TWENTY-FOUR HOURLY MEASURES of ORDINATES of the PHOTOGRAPHIC REGISTER on that DAY.

1881.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	18°	18°	18°	18°	18°	18°	18°	18°	18°	18°	18°	18°
d	′	′	′	′	′	′		′	′	′	′	′
1	30·1	31·3	28·2	28·3	26·7	26·6	. .	26·2	26·5	25·0	25·9	25·4
2	29·8	30·4	28·9	28·1	27·3	26·5	. .	25·7	26·1	24·9	26·4	24·6
3	30·2	29·8	29·1	27·7	26·9	27·7	. .	25·4	26·8	24·9	25·7	25·1
4	30·7	31·0	30·8	27·9	26·5	26·6	. .	26·2	26·0	24·5	25·9	25·3
5	30·4	30·3	29·6	27·8	26·5	28·4	. .	26·5	26·4	25·0	25·5	25·9
6	29·9	31·3	28·7	27·7	26·7	27·2	. .	27·6	26·1	25·9	25·4	25·3
7	. .	30·0	30·3	27·2	27·0	26·7	. .	26·9	26·6	24·9	25·4	25·8
8	30·0	29·6	30·2	27·7	25·8	26·9	. .	26·3	26·6	25·1	26·0	26·4
9	29·6	29·6	29·4	28·0	28·0	27·2	. .	26·3	27·3	25·0	26·5	26·2
10	30·0	29·5	29·6	28·1	26·9	27·1	. .	26·3	26·8	25·0	26·0	25·0
11	30·0	29·8	29·7	27·7	26·6	27·7	27·2	26·6	25·7	25·2	25·4	25·6
12	30·2	30·1	28·8	26·8	26·4	27·5	25·4	25·6	. .	24·9	25·6	26·1
13	29·9	29·5	30·3	28·2	26·8	26·9	26·7	26·5	. .	25·8	25·6	25·4
14	29·4	30·0	29·7	27·7	26·4	27·0	25·9	26·1	25·7	25·8	25·4	26·3
15	29·7	30·5	29·5	27·8	25·2	26·9	27·2	26·1	26·3	26·0	25·7	25·2
16	29·2	30·3	29·6	27·4	27·4	26·3	26·2	26·6	26·4	26·7	25·5	25·9
17	29·5	30·5	29·7	27·5	27·6	25·7	27·1	26·1	25·5	25·5	26·0	25·5
18	29·7	30·6	27·4	28·5	26·9	25·8	25·7	25·9	25·6	24·5	25·5	25·7
19	. .	30·6	29·8	28·6	26·9	27·0	26·3	26·8	25·3	25·9	24·9	26·6
20	. .	30·6	29·3	26·4	26·9	27·4	26·8	27·1	24·9	25·6	25·5	25·5
21	32·4	30·1	29·7	27·2	27·3	26·4	26·2	26·0	24·1	25·1	25·8	25·5
22	30·8	29·9	29·9	26·9	26·6	27·1	26·2	25·7	24·8	25·0	26·2	25·9
23	32·5	29·8	29·2	26·5	26·1	27·1	26·2	26·4	. .	24·9	25·1	23·9
24	29·1	30·1	29·2	26·4	26·4	27·0	26·4	26·6	. .	24·6	26·0	25·9
25	29·2	30·7	29·7	26·7	25·4	25·8	26·8	26·5	. .	25·8	25·6	24·9
26	28·4	31·3	29·2	27·1	24·5	26·4	26·5	26·8	. .	28·0	25·6	24·6
27	31·6	28·6	29·3	29·3	25·2	26·6	26·7	26·2	. .	26·8	25·0	25·0
28	31·7	29·7	28·7	26·9	24·5	. .	26·9	26·1	. .	26·6	25·8	24·6
29	30·5		28·9	26·0	24·2	. .	26·0	25·2	24·2	26·3	25·4	24·9
30	29·9		29·0	27·0	24·7	. .	25·5	25·5	24·4	27·5	25·2	25·2
31	. .		27·7		25·0		25·9	25·2		26·2		25·1

TABLE II.—MEAN MONTHLY DETERMINATION of the WESTERN DECLINATION of the MAGNET at every HOUR of the DAY; obtained by taking the MEAN of all the DETERMINATIONS at the same HOUR of the DAY through the MONTH.

1881.

Hour, Greenwich Mean Solar Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	18°	18°	18°	18°	18°	18°	18°	18°	18°	18°	18°	18°
h	′	′	′	′	′	′	′	′	′	′	′	′
0	32·7	33·6	34·0	32·3	31·5	32·0	31·8	32·4	31·8	30·6	29·5	28·0
1	33·7	34·6	35·6	33·9	32·0	33·2	33·0	33·6	32·8	31·1	29·5	28·8
2	32·7	34·5	35·4	33·5	31·6	33·4	32·7	32·7	31·7	30·6	29·0	28·3
3	31·5	33·4	34·3	31·9	30·3	32·7	30·9	30·8	29·8	29·2	27·5	27·5
4	31·4	31·6	31·9	30·4	29·0	31·1	29·3	28·5	28·1	27·5	26·7	26·7
5	31·0	31·1	30·2	28·7	27·9	29·1	28·0	26·6	26·6	26·3	25·7	25·5
6	30·3	30·8	29·0	27·5	26·9	27·8	27·1	25·9	26·0	25·7	25·7	25·0
7	29·5	30·0	28·8	27·0	26·1	27·2	27·1	26·0	25·5	25·3	24·8	24·4
8	28·9	29·2	28·6	26·9	25·8	26·9	27·2	25·7	25·0	24·3	23·6	23·4
9	28·7	28·5	28·4	26·9	25·7	26·8	26·8	25·4	24·6	23·5	23·7	22·9
10	28·3	28·1	28·1	26·4	25·5	26·7	26·1	25·4	24·3	23·7	23·2	23·0
11	28·5	28·2	27·5	26·0	25·6	26·4	26·0	25·4	24·3	23·8	23·4	23·3
12	28·5	28·7	27·4	26·0	25·7	25·9	25·0	25·0	24·2	24·1	23·9	23·6
13	29·0	28·9	27·4	26·2	25·5	25·4	24·4	24·8	24·2	24·0	24·4	23·9
14	29·4	29·3	27·6	26·4	25·4	25·4	24·6	24·5	23·9	24·0	24·7	24·8
15	29·7	29·2	27·9	26·0	25·2	25·2	24·5	24·3	23·7	24·0	25·3	25·6
16	29·6	29·3	27·5	25·8	24·4	24·2	23·6	23·7	23·8	24·4	25·2	25·8
17	29·8	29·3	27·7	25·7	23·1	22·5	21·9	22·9	23·7	24·3	25·1	25·6
18	29·9	29·2	28·0	25·3	22·0	21·4	21·6	21·9	23·1	24·1	25·0	25·6
19	29·9	29·2	27·5	24·2	21·5	21·2	21·7	21·5	22·3	23·5	25·3	25·7
20	29·6	28·7	26·0	23·3	21·9	21·9	21·8	22·0	21·9	22·7	25·1	25·4
21	29·6	28·6	26·0	24·2	23·5	23·3	23·5	23·7	23·1	23·0	25·0	24·8
22	30·4	29·8	28·0	26·3	26·0	26·0	25·6	26·7	25·8	25·5	26·1	25·7
23	31·5	31·7	30·9	29·2	29·1	29·3	28·9	30·0	29·2	28·7	28·1	27·1

TABLE III.

1881.

Month.	Mean Westerly Declination of the Magnet in each Month.	Excess of Westerly Declination above 17°, converted into Westerly Force, and expressed in terms of Gauss's Unit measured on the Metrical System.	Monthly Means of all the Diurnal Ranges of the Westerly Declination, as deduced from the Twenty-four Hourly Measures of each day.
	° ′		′
January	18. 30·2	0·04736	7·0
February	18. 30·2	·04736	8·5
March	18. 29·3	·04689	11·8
April	18. 27·5	·04595	11·4
May	18. 26·3	·04532	11·1
June	18. 26·9	·04563	13·4
July	18. 26·4	·04537	12·7
August	18. 26·2	·04526	12·7
September	18. 25·8	·04505	12·4
October	18. 25·6	·04495	10·3
November	18. 25·6	·04495	9·3
December	18. 25·4	·04484	8·0
Mean	18. 27·1	0·04574	10·7

The unit adopted in column 3 is the Millimètre-Milligramme-Second Unit. To express the forces on the Centimètre-Gramme-Second (C.G.S.) system, the numbers must be divided by 10, equivalent to shifting the decimal point one step towards the left.

TABLE IV.—MEAN HORIZONTAL MAGNETIC FORCE, expressed in terms of the Mean Horizontal Force for the Year, and diminished by a Constant (0·86000 nearly), uncorrected for TEMPERATURE, on each ASTRONOMICAL DAY; as deduced from the MEAN of TWENTY-FOUR HOURLY MEASURES of ORDINATES of the PHOTOGRAPHIC REGISTER on that DAY.

1881.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d												
1	0·12749	0·12688	0·13002	0·12985	0·12981	0·13152	..	0·13920	0·14086	0·14068	0·13973	0·13925
2	·12775	·12749	·13000	·12989	·12967	·13190	..	·14027	·14100	·14102	·13925	·13912
3	·12778	·12793	·12928	·13026	·13005	·13217	..	·14020	·14109	·14088	·13920	·13911
4	·12773	·12755	·12960	·13021	·13032	·13110	..	·14075	·14115	·14026	·13988	·13948
5	·12786	·12816	·12946	·13022	·13057	·13174	..	·14002	·14072	·14027	·14042	·13928
6	·12788	·12848	·12945	·13019	·13056	·13178	..	·14067	·14087	·13996	·14034	·13897
7	..	·12894	·12970	·12998	·13015	·13225	..	·14030	·14078	·13958	·14092	·13886
8	·12783	·12900	·12930	·12998	·13011	·13210	..	·14058	·14089	·13976	·13913	·13756
9	·12790	·12921	·12951	·13010	·12936	·13193	..	·14127	·14056	·13973	·13788	·13788
10	·12745	·12928	·12975	·13061	·13013	·13211	..	·14083	·14044	·14003	·13928	·13796
11	·12799	·12913	·12999	·13086	·13049	·13207	0·13688	·14091	·14081	·14050	·13924	·13930
12	·12825	·12892	·12912	·13084	·12963	·13257	·13561	·14070	..	·14041	·13986	·13892
13	·12822	·12922	·12907	·13029	·12925	·13249	·13629	·14050	..	·14105	·14023	·13913
14	·12833	·12974	·12913	·13016	·12944	·13270	·13620	·14060	·13768	·14020	·14012	·13960
15	·12864	·12833	·12961	·13040	·12920	·13276	·13662	·14095	·13824	·14052	·13986	·13993
16	·12852	·12828	·12985	·13028	·12960	·13269	·13673	·14054	·13924	·14050	·14002	·14002
17	·12879	·12895	·13017	·13021	·13030	·13325	·13636	·14075	·13867	·13947	·14004	·14001
18	·12919	·12930	·12985	·12986	·13077	·13288	·13631	·14100	·14016	·13981	·13978	·14027
19	·12920	·12962	·12983	·12975	·13052	·13288	·13662	·14184	·14034	·13970	·13972	·13994
20	·12961	·12917	·13007	·12909	·13074	·13265	·13670	·14118	·13943	·13985	·14037	·13970
21	·13021	·12911	·13016	·12886	·13077	·13279	·13664	·14088	·13942	·13909	·14051	·13966
22	·12965	·12939	·13032	·12915	·13018	·13286	·13832	·14053	·14016	·13938	·14018	·14035
23	·12970	·12921	·13068	·12952	·12975	·13304	·13863	·14073	..	·13942	·13877	·13865
24	·12902	·12924	·13041	·12977	·13054	·13267	·13809	·14145	..	·13964	·13969	·13937
25	·12955	·12975	·13025	·12962	·13156	·13272	·13825	·14090	..	·13995	·13959	·14002
26	·12984	·12928	·12999	·12980	·13163	·13231	·13818	·14020	..	·14086	·13984	·13994
27	·12925	·12788	·13036	·13043	·13131	·13333	·13804	·14043	..	·13993	·13888	·14013
28	·12937	·12929	·12998	·12960	·13115	..	·13746	·14087	..	·14020	·13923	·14012
29	·12919		·13005	·12925	·13155	..	·13843	·14090	·14048	·14044	·13882	·14028
30	·12909		·12992	·12950	·13086	..	·13839	·14047	·14052	·14063	·13932	·14019
31	..		·12901		·13104		·13922	·14081		·13985		·14040

TABLE V.—DAILY MEANS of READINGS (usually eight on each Day) of the THERMOMETER placed within the box inclosing the HORIZONTAL FORCE MAGNETOMETER, for each ASTRONOMICAL DAY.

1881.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°		°	°	°	°	°	°	°	°	°	°
1	60·7	59·8	57·2	61·1	63·0	68·1	..	65·2	63·9	63·2	58·6	65·2
2	61·6	61·0	59·0	60·0	63·3	67·7	..	65·4	64·1	62·2	60·7	64·7
3	61·5	62·8	59·1	58·0	62·3	68·5	..	65·8	64·9	62·7	63·3	64·5
4	61·1	62·9	60·7	59·6	63·1	68·0	..	67·2	65·4	63·2	65·1	63·6
5	60·2	61·0	62·9	60·8	63·7	64·7	..	67·8	65·6	62·4	65·2	63·5
6	59·0	58·5	63·1	60·8	65·3	63·8	..	67·1	65·6	64·3	64·6	63·1
7	..	58·0	62·2	60·8	65·4	62·9	..	67·0	65·6	65·0	64·0	64·6
8	60·7	59·8	61·2	62·2	64·5	62·5	..	65·9	66·3	64·1	64·4	64·8
9	61·2	60·8	61·9	62·7	62·9	62·7	..	64·3	65·8	63·6	63·7	64·6
10	60·9	60·7	63·0	62·7	61·7	62·9	..	64·2	65·5	64·6	64·4	64·0
11	60·6	59·7	63·0	63·8	62·7	63·8	67·6	64·1	65·4	65·0	65·0	63·8
12	58·8	59·7	61·3	64·0	63·9	64·6	68·9	64·4	..	64·7	64·8	63·2
13	55·5	59·9	59·8	64·1	65·0	64·2	69·3	64·3	..	64·4	64·8	62·3
14	54·4	60·2	60·3	63·4	65·7	63·9	70·7	64·0	66·6	63·4	64·8	62·9
15	55·4	60·9	60·4	62·3	65·0	64·7	71·9	64·7	65·9	61·0	63·8	62·7
16	53·8	60·8	60·5	63·2	64·2	65·8	71·7	66·3	65·3	61·5	63·3	62·5
17	52·8	61·5	61·0	64·1	64·3	66·5	70·8	66·1	66·3	61·3	63·5	61·9
18	53·7	62·9	62·0	63·9	65·1	65·2	71·0	65·6	67·1	60·9	63·0	61·6
19	54·4	60·8	61·7	62·5	64·4	64·5	71·2	65·2	66·6	60·7	62·8	62·8
20	53·3	60·1	60·9	62·3	64·4	65·1	67·6	65·1	67·9	62·2	63·0	62·9
21	51·8	59·8	59·8	62·2	65·3	65·5	66·2	64·7	67·9	63·4	63·5	63·2
22	52·8	59·2	59·9	63·2	66·3	64·6	65·3	64·9	66·3	63·0	64·7	61·6
23	54·1	59·7	61·0	63·3	67·3	64·5	67·1	65·9	..	63·3	65·0	59·2
24	54·2	60·1	61·2	64·1	66·4	64·8	66·7	65·1	..	62·6	64·4	57·9
25	51·7	60·0	60·9	64·8	66·4	64·4	64·7	65·6	..	61·3	64·1	57·8
26	51·6	59·6	60·5	63·1	66·7	65·1	64·0	65·3	..	61·5	63·4	59·8
27	56·0	59·0	59·5	62·9	67·2	64·9	63·1	63·7	..	61·3	63·9	60·9
28	58·4	58·5	60·9	63·6	67·8	..	64·6	63·7	..	61·3	64·9	60·7
29	61·4		61·3	64·3	66·2	..	66·4	63·9	63·8	60·9	64·2	60·6
30	61·2		60·2	64·2	66·5	..	65·8	63·6	63·7	60·0	64·8	61·0
31	..		60·5		67·6		65·0	63·0		57·7		61·1

TABLE VI.—MEAN MONTHLY DETERMINATION of the HORIZONTAL MAGNETIC FORCE, expressed in terms of the Mean Horizontal Force for the Year, and diminished by a Constant (0·86000 nearly), uncorrected for TEMPERATURE, at every HOUR of the DAY; obtained by taking the MEAN of all the DETERMINATIONS at the same HOUR of the DAY through each MONTH.

1881.

Hour, Greenwich Mean Solar Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
h												
0	0·12839	0·12790	0·12905	0·12900	0·12962	0·13155	0·13628	0·13991	0·13930	0·13921	0·13905	0·13913
1	·12868	·12822	·12936	·12944	·12988	·13187	·13698	·14042	·13987	·13955	·13929	·13927
2	·12879	·12854	·12971	·12989	·13016	·13240	·13755	·14057	·14017	·13994	·13942	·13923
3	·12883	·12879	·12993	·13025	·13053	·13277	·13795	·14077	·14041	·14004	·13948	·13921
4	·12876	·12884	·12996	·13041	·13080	·13295	·13799	·14094	·14047	·14013	·13962	·13927
5	·12870	·12888	·12998	·13047	·13109	·13316	·13784	·14109	·14056	·14020	·13970	·13935
6	·12865	·12892	·13004	·13057	·13119	·13324	·13783	·14123	·14078	·14038	·13979	·13936
7	·12860	·12889	·13006	·13063	·13114	·13319	·13787	·14133	·14082	·14050	·13980	·13931
8	·12856	·12891	·13009	·13063	·13097	·13306	·13788	·14135	·14078	·14045	·13979	·13929
9	·12858	·12894	·13016	·13053	·13084	·13286	·13790	·14131	·14070	·14043	·13983	·13934
10	·12866	·12900	·13016	·13039	·13075	·13273	·13786	·14124	·14062	·14053	·13992	·13938
11	·12863	·12900	·13010	·13027	·13060	·13272	·13780	·14115	·14059	·14063	·13986	·13943
12	·12861	·12898	·13003	·13015	·13055	·13272	·13771	·14110	·14053	·14062	·13980	·13947
13	·12859	·12897	·13003	·13008	·13050	·13270	·13772	·14109	·14047	·14062	·13987	·13962
14	·12862	·12898	·12997	·13005	·13047	·13273	·13771	·14099	·14047	·14058	·13988	·13956
15	·12871	·12906	·13003	·13006	·13045	·13281	·13773	·14099	·14043	·14046	·13993	·13961
16	·12877	·12919	·13002	·13009	·13047	·13283	·13764	·14096	·14043	·14050	·14011	·13976
17	·12891	·12933	·13004	·13009	·13050	·13266	·13757	·14085	·14047	·14056	·14021	·13996
18	·12902	·12937	·13011	·13011	·13025	·13231	·13732	·14065	·14029	·14054	·14025	·14012
19	·12901	·12928	·13003	·12992	·12999	·13193	·13698	·14031	·13991	·14030	·13995	·14002
20	·12885	·12900	·12973	·12955	·12972	·13148	·13637	·13986	·13938	·13975	·13959	·13977
21	·12849	·12852	·12915	·12901	·12943	·13107	·13594	·13950	·13890	·13921	·13921	·13945
22	·12828	·12807	·12880	·12862	·12927	·13096	·13570	·13930	·13868	·13880	·13890	·13914
23	·12827	·12791	·12871	·12862	·12934	·13127	·13585	·13950	·13881	·13885	·13887	·13908

TABLE VII.—MONTHLY MEANS of READINGS of the THERMOMETER placed within the box inclosing the HORIZONTAL FORCE MAGNETOMETER, at each of the ordinary Hours of Observation.

1881.

Hour, Greenwich Mean Solar Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
h	°	°	°	°	°	°	°	°	°	°	°	°
0	56·8	60·2	60·6	62·4	64·8	64·9	67·5	65·0	65·5	62·5	63·6	62·3
1	56·8	60·3	60·7	62·5	65·0	65·1	67·7	65·2	65·7	62·6	63·7	62·4
2	56·9	60·4	60·8	62·7	65·3	65·4	68·0	65·5	65·9	62·7	63·8	62·5
3	57·2	60·4	60·9	62·8	65·5	65·6	68·3	65·7	66·0	62·8	63·9	62·6
9	57·6	60·4	61·3	63·2	65·7	66·0	68·8	66·1	66·4	63·0	64·1	62·6
21	56·9	60·2	61·0	62·5	64·3	64·0	66·7	64·4	65·3	62·1	63·9	62·2
22	56·9	60·2	60·8	62·4	64·5	64·2	66·8	64·5	65·3	62·1	63·9	62·1
23	56·8	60·1	60·7	62·4	64·6	64·4	67·1	64·7	65·4	62·1	63·9	62·1

TABLE VIII.

1881.

Month.	MEAN HORIZONTAL MAGNETIC FORCE in EACH MONTH, uncorrected for TEMPERATURE. Expressed in terms of the MEAN HORIZONTAL FORCE for the Year, and diminished by a Constant (0·86000 nearly).	Expressed in terms of GAUSS'S UNIT measured on the METRICAL SYSTEM, and diminished by a Constant (1·55230 nearly).	Mean Temperature.
			°
January	0·12866	0·23223	57·0
February	·12881	·23250	60·3
March	·12980	·23429	60·9
April	·12995	·23456	62·6
May	·13035	·23528	65·0
June	·13242	·23902	65·0
July	·13733	·24788	67·6
August	·14068	·25393	65·1
September	·14016	·25299	65·7
October	·14012	·25292	62·5
November	·13967	·25210	63·9
December	·13946	·25173	62·4

The unit adopted in column 3 is the Millimètre-Milligramme-Second Unit. To express the forces on the Centimètre-Gramme-Second (C.G.S.) system, the numbers must be divided by 10, equivalent to shifting the decimal point one step towards the left.

The value 0·86000 of Horizontal Force corresponds to 1·55230 of Gauss's Unit on the Metrical (Millimètre-Milligramme-Second) system, and to 0·15523 on the C.G.S. system.

TABLE IX.—MEAN VERTICAL MAGNETIC FORCE, expressed in terms of the Mean Vertical Force for the Year, and diminished by a Constant (0·96000 nearly), uncorrected for TEMPERATURE, on each ASTRONOMICAL DAY; as deduced from the MEAN of TWENTY-FOUR HOURLY MEASURES of ORDINATES of the PHOTOGRAPHIC REGISTER on that DAY.

1881.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d												
1	0·02754	0·02648	0·02385	0·02624	0·02788	0·03461	0·03117	0·03096	0·02836	0·02868	0·02197	0·02692
2	·02875	·02798	·02521	·02513	·02834	·03455	·03150	·03115	·02887	·02770	·02321	·02685
3	·02849	·02961	·02508	·02419	·02724	·03527	·03351	·03164	·02934	·02814	·02612	·02618
4	·02795	·02984	·02645	·02567	·02784	·03520	·03531	·03246	·02952	·02768	·02823	·02532
5	·02660	·02723	·02815	·02641	·02850	·03194	·03666	·03364	·02994	·02690	·02860	·02542
6	·02597	·02537	·02846	·02605	·03034	·03119	·03335	·03212	·03028	·02869	·02783	·02522
7	·02668	·02456	·02752	·02599	·02993	·02963	·03048	·03164	·03039	·02917	·02724	·02598
8	·02705	·02637	·02690	·02724	·02875	·02977	·03066	·03167	·03071	·02830	·02792	·02642
9	·02694	·02735	·02742	·02801	·02742	·02956	·03189	·03014	·03048	·02795	·02780	·02635
10	·02678	·02697	·02881	·02816	·02640	·02929	·03288	·02981	·03004	·02849	·02803	·02577

TABLE IX.—MEAN VERTICAL MAGNETIC FORCE, expressed in terms of the Mean Vertical Force for the Year, &c.—*concluded.*

1881.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d												
11	0·02638	0·02599	0·02885	0·02827	0·02685	0·03038	0·03380	0·02997	0·02982	0·02934	0·02856	0·02477
12	·02495	·02635	·02745	·02852	·02797	·03129	·03511	·03018	..	·02917	·02828	·02483
13	·02401	·02608	·02630	·02867	·02903	·03037	·03545	·02973	..	·02852	·02826	·02409
14	·02265	·02620	·02678	·02870	·03023	·02996	·03670	·02911	·03111	·02770	·02802	·02482
15	·02238	·02718	·02694	·02822	·02918	·03063	·03769	·02969	·03035	·02615	·02711	·02441
16	·02064	·02685	·02719	·02854	·02861	·03188	·03755	·03137	·02993	·02522	·02678	·02417
17	·01998	·02678	·02733	·02923	·02791	·03263	·03642	·03095	·03103	·02536	·02667	·02413
18	·02025	·02814	·02808	·02871	·02852	·03138	·03675	·03082	·03194	·02465	·02652	·02304
19	·02077	·02620	·02795	·02723	·02832	·03084	·03745	·03025	·03153	·02483	·02610	·02415
20	·01970	·02578	·02739	·02708	·02828	·03150	·03395	·03042	·03247	..	·02640	·02385
21	·01871	·02518	·02588	·02743	·02898	·03217	·03195	·03019	·03172	·02701	·02660	·02410
22	·01942	·02504	·02555	·02780	·02995	·03119	·03104	·03012	·03008	·02711	·02648	·02237
23	·02078	·02544	·02595	·02790	·03093	·03105	·03228	·03101	·03074	·02762	·02610	·02060
24	·02067	·02597	·02653	..	·02977	·03088	·03197	·03002	·03190	·02691	·02644	·01933
25	·01864	·02586	·02615	·02942	·02980	·03047	·02982	·03073	·03125	·02603	·02658	·01903
26	·01912	·02588	·02592	·02769	·03093	·03147	·02975	·02982	·03089	·02568	·02572	·02108
27	·02291	·02572	·02520	·02718	·03123	·03123	·02871	·02911	·03060	·02414	·02557	·02204
28	·02500	·02470	·02624	·02809	·03246	·03108	·03007	·02882	·02993	·02410	·02647	·02176
29	·02655		·02631	·02881	·03013	·03075	·03162	·02873	·02957	·02407	·02619	·02189
30	·02678		·02547	·02888	·02988	·03005	·03153	·02897	·02934	·02294	·02660	·02199
31	..		·02562		·03130		·03082	·02793		·02136		·02195

TABLE X.—DAILY MEANS of READINGS (usually eight on each Day) of the THERMOMETER placed within the box inclosing the VERTICAL FORCE MAGNETOMETER, for each ASTRONOMICAL DAY.

1881.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	60·5	59·8	57·4	60·8	63·0	68·9	65·7	65·4	63·3	63·9	58·5	64·4
2	61·6	61·3	59·6	59·6	63·1	68·9	66·2	65·7	64·0	63·0	60·3	63·8
3	61·5	63·2	59·6	58·8	62·2	69·4	67·2	65·9	64·4	63·6	63·2	63·2
4	61·2	63·1	60·8	60·5	62·8	68·9	69·3	67·2	64·7	63·5	65·1	62·5
5	59·5	61·0	62·4	61·3	63·8	65·6	70·3	68·0	65·1	62·7	65·3	62·6
6	59·0	58·7	62·5	60·9	65·5	64·6	67·6	67·0	65·2	64·4	64·6	62·4
7	59·8	58·3	61·7	61·1	65·1	63·4	64·6	66·6	65·2	65·0	64·1	63·3
8	60·2	60·1	60·7	62·3	64·2	63·3	64·6	65·8	65·8	64·1	64·4	63·3
9	60·3	61·4	61·5	63·2	62·8	63·1	66·2	64·4	65·7	63·6	63·8	63·2
10	60·1	61·1	62·5	63·4	61·6	63·0	67·5	64·2	65·0	64·3	64·3	62·4
11	59·6	59·8	62·9	63·4	62·2	64·3	68·7	64·1	64·9	65·1	64·8	62·0
12	58·4	59·9	61·6	63·5	63·5	65·2	69·6	64·3	..	64·7	64·6	61·8
13	55·2	60·0	60·0	63·7	64·7	64·6	69·8	64·0	..	64·2	64·6	61·1
14	53·8	60·6	60·6	63·6	65·8	64·3	70·9	63·7	65·7	63·4	64·7	62·0
15	55·0	61·1	61·0	63·1	65·1	64·9	71·8	64·4	65·0	61·7	63·6	62·0
16	53·3	60·8	61·3	63·6	64·4	65·8	71·8	65·8	64·7	60·9	63·1	61·6
17	52·4	60·9	61·3	63·8	63·9	66·4	70·9	65·4	65·8	61·0	63·2	61·1
18	53·3	62·2	61·8	63·6	64·5	65·3	71·2	65·4	66·9	60·4	63·2	60·2
19	54·2	60·5	61·8	62·4	63·9	64·9	71·2	65·3	66·6	61·0	63·0	61·4
20	53·2	59·8	61·2	62·3	64·0	65·5	68·0	65·1	67·4	..	63·2	61·3
21	51·7	59·3	60·1	62·1	65·0	66·0	66·7	64·9	67·1	63·5	63·6	61·4
22	52·6	58·9	59·8	62·8	66·2	65·5	65·6	65·2	65·4	63·4	63·9	60·0
23	54·1	59·7	60·7	63·0	67·1	65·4	66·8	65·9	65·9	63·5	63·2	57·5
24	53·9	60·1	60·8	..	66·3	65·3	66·1	65·0	67·2	63·2	63·3	56·1
25	51·5	60·1	60·5	64·4	66·4	64·9	64·3	65·6	66·7	62·3	63·5	56·4
26	52·2	60·0	60·6	62·6	66·9	65·5	64·0	65·1	66·0	62·0	62·4	58·6
27	56·4	59·5	59·8	62·6	67·3	65·6	63·4	63·7	65·8	60·5	62·5	59·6
28	58·8	58·8	60·9	63·1	68·3	65·6	64·6	63·6	65·2	60·4	63·5	59·3
29	60·8		61·3	63·5	66·5	65·6	66·2	63·9	64·7	60·4	63·3	59·6
30	60·1		60·3	63·8	66·6	65·0	66·0	64·0	64·5	59·2	63·9	59·9
31	..		60·5		68·3		65·2	63·0		57·5		59·7

TABLE XI.—MEAN MONTHLY DETERMINATION of the VERTICAL MAGNETIC FORCE, expressed in terms of the Mean Vertical Force for the Year, and diminished by a Constant (0·96000 nearly), uncorrected for TEMPERATURE, at every HOUR of the DAY; obtained by taking the MEAN of all the DETERMINATIONS at the same HOUR of the DAY through each MONTH.

1881.

Hour, Greenwich Mean Solar Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
h												
0	0·02331	0·02624	0·02591	0·02672	0·02834	0·03074	0·03244	0·02968	0·02977	0·02629	0·02639	0·02366
1	·02352	·02641	·02616	·02698	·02874	·03115	·03285	·03008	·03008	·02651	·02663	·02388
2	·02369	·02654	·02644	·02730	·02911	·03155	·03326	·03042	·03030	·02671	·02684	·02407
3	·02380	·02665	·02675	·02757	·02939	·03191	·03360	·03075	·03051	·02692	·02700	·02419
4	·02388	·02675	·02698	·02776	·02967	·03223	·03388	·03099	·03069	·02708	·02702	·02427
5	·02403	·02678	·02713	·02797	·02987	·03243	·03398	·03112	·03085	·02711	·02708	·02431
6	·02412	·02680	·02719	·02806	·02996	·03256	·03408	·03115	·03093	·02718	·02709	·02435
7	·02414	·02680	·02722	·02809	·02997	·03258	·03414	·03116	·03100	·02723	·02710	·02434
8	·02410	·02672	·02715	·02814	·02993	·03256	·03415	·03122	·03106	·02720	·02707	·02428
9	·02401	·02654	·02693	·02806	·02982	·03248	·03414	·03117	·03100	·02715	·02700	·02415
10	·02395	·02646	·02687	·02794	·02970	·03232	·03396	·03106	·03093	·02708	·02694	·02401
11	·02399	·02651	·02694	·02800	·02966	·03211	·03377	·03095	·03088	·02701	·02694	·02397
12	·02395	·02654	·02696	·02805	·02955	·03180	·03356	·03082	·03080	·02695	·02690	·02393
13	·02395	·02653	·02692	·02797	·02939	·03145	·03325	·03065	·03064	·02680	·02680	·02377
14	·02389	·02649	·02685	·02786	·02920	·03117	·03302	·03050	·03050	·02666	·02667	·02366
15	·02386	·02644	·02672	·02771	·02903	·03093	·03283	·03033	·03042	·02653	·02658	·02359
16	·02380	·02640	·02662	·02760	·02886	·03076	·03268	·03018	·03031	·02644	·02652	·02350
17	·02372	·02633	·02657	·02748	·02871	·03062	·03253	·03005	·03023	·02633	·02645	·02348
18	·02363	·02628	·02650	·02740	·02855	·03048	·03236	·02994	·03018	·02628	·02643	·02344
19	·02360	·02629	·02651	·02731	·02844	·03042	·03230	·02982	·03012	·02629	·02647	·02343
20	·02352	·02631	·02648	·02718	·02834	·03038	·03225	·02969	·03001	·02622	·02650	·02345
21	·02343	·02625	·02637	·02702	·02831	·03037	·03225	·02955	·02985	·02608	·02653	·02343
22	·02332	·02613	·02612	·02682	·02828	·03036	·03224	·02947	·02971	·02588	·02648	·02341
23	·02321	·02605	·02593	·02663	·02824	·03041	·03223	·02943	·02963	·02577	·02647	·02339

TABLE XII.—MONTHLY MEANS of READINGS of the THERMOMETER placed within the box inclosing the VERTICAL FORCE MAGNETOMETER, at each of the ordinary Hours of Observation.

1881.

Hour, Greenwich Mean Solar Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
h	°	°	°	°	°	°	°	°	°	°	°	°
0	56·7	60·4	60·7	62·4	64·8	65·5	67·4	65·0	65·4	62·6	63·4	61·1
1	56·8	60·5	60·9	62·6	65·0	65·8	67·6	65·3	65·6	62·8	63·5	61·3
2	56·9	60·5	61·0	62·7	65·2	65·9	67·9	65·5	65·7	62·9	63·5	61·4
3	57·2	60·5	61·1	62·8	65·3	66·1	68·0	65·6	65·8	63·0	63·6	61·4
9	57·3	60·3	61·2	63·1	65·4	66·2	68·3	65·8	66·1	63·1	63·7	61·2
21	56·5	60·3	60·9	62·1	64·3	64·6	66·7	64·3	65·0	62·0	63·5	60·8
22	56·5	60·3	60·7	62·1	64·4	64·8	66·8	64·5	65·1	62·0	63·4	60·7
23	56·5	60·1	60·7	62·2	64·5	65·0	67·0	64·6	65·2	62·1	63·5	60·8

TABLE XIII.

1881.

Month.	Mean Vertical Magnetic Force in each Month, uncorrected for Temperature. Expressed in terms of the Mean Vertical Force for the Year, and diminished by a Constant (0·96000 nearly).	Expressed in terms of Gauss's Unit measured on the Metrical System, and diminished by a Constant (4·19889 nearly).	Mean Temperature.
			°
January	0·02377	0·10397	56·8
February	·02647	·11577	60·4
March	·02668	·11669	60·9
April	·02757	·12059	62·5
May	·02913	·12741	64·9
June	·03141	·13738	65·5
July	·03316	·14504	67·5
August	·03042	·13305	65·1
September	·03043	·13309	65·5
October	·02665	·11656	62·6
November	·02675	·11700	63·5
December	·02383	·10423	61·1

The unit adopted in column 3 is the Millimètre-Milligramme-Second Unit. To express the forces on the Centimètre-Gramme-Second (C.G.S.) system, the numbers must be divided by 10, equivalent to shifting the decimal point one step towards the left.

The value 0·96000 of Vertical Force corresponds to 4·19889 of Gauss's Unit on the Metrical (Millimètre-Milligramme-Second) system, and to 0·41989 on the C.G.S. system.

Commencing with the month of June a different value of the time of vibration of the magnet in the vertical plane was adopted in the reduction of the observations.

TABLE XIV.—MEAN, through the Range of Months, of the MONTHLY MEAN DETERMINATIONS of the DIURNAL INEQUALITIES of DECLINATION, HORIZONTAL FORCE, and VERTICAL FORCE, for the Year 1881.

(The Results for Horizontal Force and Vertical Force are not corrected for Temperature.)

January to December.

Hour, Greenwich Mean Solar Time.	Inequality of Declination.	Equivalent in terms of Gauss's Unit measured on the Metrical System.	Inequality of Horizontal Force.	Equivalent in terms of Gauss's Unit measured on the Metrical System.	Inequality of Vertical Force.	Equivalent in terms of Gauss's Unit measured on the Metrical System.
h	′					
0	+ 4·57	+ 0·00240	− 0·00075	− 0·00135	− 0·00057	− 0·00249
1	+ 5·53	+ 290	− 38	− 69	− 27	− 118
2	+ 5·06	+ 266	− 9	− 16	0	0
3	+ 3·70	+ 194	+ 13	+ 23	+ 23	+ 101
4	+ 2·23	+ 117	+ 23	+ 42	+ 41	+ 179
5	+ 0·94	+ 49	+ 30	+ 54	+ 53	+ 232
6	+ 0·19	+ 10	+ 38	+ 69	+ 60	+ 262
7	− 0·31	− 16	+ 39	+ 70	+ 62	+ 271
8	− 0·82	− 43	+ 36	+ 65	+ 61	+ 267
9	− 1·13	− 59	+ 33	+ 60	+ 52	+ 227
10	− 1·38	− 72	+ 32	+ 58	+ 41	+ 179
11	− 1·42	− 75	+ 28	+ 51	+ 37	+ 162
12	− 1·45	− 76	+ 24	+ 43	+ 30	+ 131
13	− 1·44	− 76	+ 24	+ 43	+ 15	+ 66
14	− 1·28	− 67	+ 22	+ 40	+ 2	+ 9
15	− 1·23	− 65	+ 24	+ 43	− 11	− 48
16	− 1·51	− 79	+ 28	+ 51	− 22	− 96
17	− 1·98	− 104	+ 31	+ 56	− 31	− 136
18	− 2·36	− 124	+ 24	+ 43	− 40	− 175
19	− 2·66	− 140	+ 2	+ 4	− 44	− 192
20	− 2·93	− 154	− 36	− 65	− 50	− 219
21	− 2·26	− 119	− 79	− 143	− 57	− 249
22	− 0·29	− 15	− 107	− 193	− 67	− 293
23	+ 2·36	+ 124	− 103	− 186	− 74	− 324

Hour, Greenwich Mean Solar Time.	Mean Readings of Thermometers. Horizontal Force.	Vertical Force.
h	°	°
0	63·00	62·95
1	63·16	63·14
2	63·32	63·25
3	63·48	63·38
9	63·78	63·48
21	62·79	62·58
22	62·80	62·61
23	62·85	62·69

The unit adopted in columns 3, 5, and 7 is the Millimètre-Milligramme-Second Unit. To express the inequalities on the Centimètre-Gramme-Second (C.G.S.) system, the numbers must be divided by 10, equivalent to shifting the decimal point one step towards the left.

ROYAL OBSERVATORY, GREENWICH.

INDICATIONS

OF

MAGNETOMETERS

ON THREE DAYS OF GREAT MAGNETIC DISTURBANCE.

1881.

Greenwich Mean Solar Time.	Western Declination.	Excess of Western Declination above 17°, converted into Westerly Force, and expressed in terms of Gauss's Unit measured on the Metrical System.
Jan. 31 h m	° ′ ″	
0. 0	18. 32. 45	·0487
0. 8	30. 50	·0477
0. 14	31. 55	·0483
0. 19	31. 0	·0478
0. 33	36. 30	·0507
0. 40	37. 5	·0509
0. 47	36. 5	·0504
0. 57	39. 50	·0524
1. 6	36. 40	·0508
1. 13	40. 0	·0525
1. 18	39. 15	·0521
1. 21	41. 45	·0534
1. 36	37. 0	·0509
1. 42	36. 15	·0505
1. 52	46. 0	·0557
2. 6	37. 55	·0514
2. 23	41. 35	·0533
2. 30	41. 50	·0534
2. 38	38. 40	·0519
2. 45	39. 25	·0522
3. 0	46. 30	·0560
3. 22	40. 5	·0525
3. 36	42. 55	·0541
3. 44	33. 15	·0489
3. 50	48. 25	·0569
3. 56	32. 0	·0483
3. 58	32. 45	·0487
4. 4	25. 25	·0448
4. 15	42. 50	·0540
4. 17	38. 40	·0519
4. 19	42. 45	·0540
4. 32	31. 30	·0481
4. 39	40. 50	·0529
4. 45	28. 35	·0465
4. 50	35. 15	·0500
4. 58	28. 5	·0462
5. 10	39. 20	·0522
5. 20	19. 0	·0415
5. 32	33. 5	·0488
5. 42	18. 26. 25	·0454
5. 55	19. 7. 25	·0669
6. 7	18. 25. 30	·0449
6. 12	30. 45	·0477
6. 16	23. 50	·0440
6. 28	35. 25	·0501
6. 36	14. 25	·0391
6. 40	29. 35	·0470
6. 47	19. 0	·0415
6. 51	23. 15	·0437
6. 58	13. 40	·0387
7. 8	50. 40	·0582
7. 10	45. 10	·0552
7. 12	46. 55	·0562

Greenwich Mean Solar Time.	Horizontal Force (diminished by a Constant) uncorrected for Temperature. Expressed in parts of the whole Horizontal Force.	Expressed in terms of Gauss's Unit measured on the Metrical System.
Jan. 31 h m		
0. 0	·1248	·2252
0. 2	·1246	·2249
0. 29	·1269	·2290
0. 46	·1250	·2256
0. 54	·1257	·2269
1. 6	·1246	·2249
1. 15	·1252	·2260
1. 19	·1248	·2252
1. 23	·1250	·2256
1. 30	·1243	·2243
1. 36	·1252	·2260
1. 40	·1249	·2254
1. 55	·1272	·2296
2. 0	·1244	·2245
2. 19	·1265	·2283
2. 36	·1261	·2276
2. 57	·1288	·2324
3. 26	·1261	·2276
3. 31	·1267	·2287
3. 36	·1262	·2278
3. 49	·1300	·2347
3. 55	·1222	·2206
3. 57	·1227	·2215
4. 1	·1210	·2184
4. 10	·1260	·2274
4. 15	·1248	·2252
4. 18	·1260	·2274
4. 22	·1241	·2240
4. 24	·1245	·2247
4. 26	·1240	·2238
4. 35	·1269	·2290
4. 39	·1243	·2243
4. 46	·1264	·2281
4. 50	·1234	·2227
4. 59	·1252	·2260
5. 12	·1210	·2184
5. 24	·1248	·2252
5. 30	·1231	·2222
5. 47	·1313	·2370
5. 56	·1245	·2247
5. 59	·1260	·2274
6. 3	·1241	·2240
6. 8	·1249	·2254
6. 15	·1228	·2216
6. 24	·1260	·2274
6. 26	·1256	·2267
6. 35	·1339	·2417
6. 46	·1156	·2087
6. 54	·1238	·2234
6. 55	·1224	·2209
6. 59	·1244	·2245
7. 6	·1205	·2175
7. 11	·1210	·2200

Greenwich Mean Solar Time.	Vertical Force (diminished by a Constant) uncorrected for Temperature. Expressed in parts of the whole Vertical Force.	Expressed in terms of Gauss's Unit measured on the Metrical System.
Jan. 31 h m		
0. 0	·0262	·1146
0. 30	·0265	·1159
0. 45	·0265	·1159
0. 57	·0267	·1168
1. 8	·0267	·1168
1. 22	·0270	·1181
1. 37	·0269	·1176
1. 48	·0274	·1198
2. 0	·0271	·1185
2. 37	·0276	·1207
3. 5	·0283	·1238
3. 13	·0283	·1238
3. 56	·0309	·1351
4. 5	·0304	·1329
4. 12	·0305	·1334
4. 26	·0317	·1387
4. 34	·0320	·1400
	(†)	
4. 57	·0319	·1395
5. 9	·0316	·1382
5. 16	·0320	·1400
5. 25	·0307	·1343
5. 33	·0303	·1325
5. 43	·0309	·1351
5. 50	·0308	·1347
6. 0	·0320	·1400
	(†)	
6. 43	·0284	·1242
6. 47	·0310	·1356
6. 50	·0303	·1325
6. 58	·0312	·1365
7. 4	·0296	·1294
7. 17	·0316	·1382
7. 29	·0335	·1465
7. 37	·0295	·1290
7. 43	·0297	·1299
7. 52	·0279	·1220
8. 6	·0253	·1106
8. 8	·0266	·1163
8. 12	·0262	·1146
8. 18	·0276	·1207
8. 26	·0264	·1154
8. 36	·0281	·1229
8. 38	·0280	·1225
8. 46	·0282	·1234
9. 5	·0281	·1229
9. 23	·0275	·1203
9. 30	·0276	·1207
9. 48	·0273	·1194
10. 5	·0277	·1212
10. 36	·0274	·1198
10. 59	·0275	·1203
11. 16	·0274	·1198

Greenwich Mean Solar Time.	Western Declination.	Excess of Western Declination above 17°, converted into Westerly Force, and expressed in terms of Gauss's Unit measured on the Metrical System.
Jan. 31 h m	° ′ ″	
7. 30	17. 56. 30	·0297
7. 34	18. 1. 20	·0322
7. 37	17. 57. 25	·0301
7. 43	18. 3. 55	·0336
7. 46	17. 53. 0	·0278
8. 6	18. 39. 25	·0522
8. 8	34. 10	·0495
8. 12	44. 50	·0550
8. 25	7. 0	·0352
8. 30	21. 0	·0425
8. 38	9. 15	·0363
8. 51	19. 0	·0415
9. 5	22. 45	·0435
9. 8	22. 0	·0431
9. 12	24. 5	·0441
9. 19	23. 20	·0438
9. 24	24. 35	·0444
9. 30	21. 55	·0430
9. 32	24. 0	·0441
9. 41	22. 20	·0433
9. 45	24. 25	·0443
9. 48	21. 20	·0427
9. 54	23. 25	·0438
10. 6	23. 0	·0436
10. 12	21. 20	·0427
10. 17	21. 40	·0429
10. 28	18. 50	·0414
10. 30	19. 35	·0418
10. 44	16. 50	·0403
11. 0	23. 25	·0438
11. 5	22. 55	·0436
11. 13	25. 0	·0446
11. 24	22. 30	·0434
11. 30	25. 5	·0446
11. 48	19. 15	·0416
11. 53	17. 40	·0408
12. 9	28. 35	·0465
12. 20	42. 55	·0541
12. 42	21. 35	·0428
12. 55	23. 20	·0438
13. 9	19. 35	·0418
13. 20	20. 0	·0420
13. 34	23. 30	·0439
13. 40	22. 0	·0431
13. 54	26. 40	·0456
14. 1	26. 10	·0453
14. 6	27. 0	·0457
14. 12	25. 45	·0450
14. 17	26. 40	·0456
14. 24	26. 0	·0452
14. 32	27. 10	·0458
14. 38	25. 55	·0451
14. 48	26. 35	·0455

Greenwich Mean Solar Time.	Horizontal Force (diminished by a Constant) uncorrected for Temperature. Expressed in parts of the whole Horizontal Force.	Expressed in terms of Gauss's Unit measured on the Metrical System.
Jan. 31 h m		
7. 15	·1202	·2170
7. 20	·1233	·2225
7. 30	·1186	·2141
7. 39	·1226	·2213
7. 46	·1182	·2134
7. 50	·1205	·2175
7. 52	·1201	·2168
7. 58	·1231	·2222
8. 5	·1195	·2157
8. 8	·1217	·2197
8. 14	·1154	·2083
8. 24	·1193	·2153
8. 27	·1176	·2123
8. 32	·1196	·2159
8. 43	·1212	·2188
9. 4	·1225	·2211
9. 6	·1221	·2204
9. 10	·1230	·2220
9. 14	·1223	·2207
9. 17	·1226	·2213
9. 25	·1219	·2200
9. 30	·1226	·2213
9. 38	·1219	·2200
9. 40	·1227	·2215
9. 45	·1218	·2198
9. 55	·1232	·2224
	***	
10. 25	·1233	·2225
10. 37	·1220	·2202
11. 0	·1223	·2207
11. 25	·1245	·2247
11. 46	·1231	·2222
11. 59	·1246	·2249
12. 7	·1233	·2225
12. 15	·1271	·2294
12. 34	·1226	·2213
12. 46	·1258	·2270
12. 50	·1263	·2279
12. 55	·1259	·2272
12. 57	·1264	·2281
13. 8	·1256	·2267
13. 15	·1257	·2269
13. 25	·1253	·2261
13. 38	·1241	·2240
13. 46	·1247	·2251
14. 14	·1236	·2231
14. 19	·1242	·2242
14. 21	·1238	·2234
14. 28	·1244	·2245
14. 42	·1243	·2243
14. 49	·1240	·2238
15. 8	·1243	·2243
15. 29	·1238	·2234

Greenwich Mean Solar Time.	Vertical Force (diminished by a Constant) uncorrected for Temperature. Expressed in parts of the whole Vertical Force.	Expressed in terms of Gauss's Unit measured on the Metrical System.
Jan. 31 h m		
11. 45	·0267	·1168
11. 54	·0268	·1172
12. 5	·0266	·1163
12. 13	·0268	·1172
12. 29	·0256	·1119
12. 45	·0266	·1163
13. 15	·0270	·1181
13. 39	·0271	·1185
13. 53	·0272	·1190
14. 12	·0271	·1185
14. 28	·0272	·1190
15. 7	·0271	·1185
15. 25	·0272	·1190
16. 23	·0271	·1185
16. 37	·0272	·1190
17. 47	·0272	·1190
19. 7	·0274	·1198
19. 36	·0274	·1198
20. 7	·0275	·1203
21. 50	·0272	·1190
23. 22	·0271	·1185
	(†)	

The indications are taken from the sheets of the Photographic Record. The Symbol *** denotes that the magnet has been generally in a state of slight agitation, and the Symbol (†) that the register has failed between the preceding and following readings.

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

The constant by which the values of Horizontal Force are diminished is 0·8600 nearly, as expressed in parts of the whole Horizontal Force, equivalent to 1·5523 in terms of Gauss's Unit measured on the Metrical (Millimètre-Milligramme-Second) system. The corresponding constant for Vertical Force is 0·9600 nearly, equivalent to 4·1989 in terms of Gauss's Unit. To express the Metrical measures on the C.G.S. (Centimètre-Gramme-Second) system, the numbers must be divided by 10, equivalent to shifting the decimal point one step towards the left.

January 31. The spot of light for Vertical Force was off the sheet in the direction of *increasing* force from 4^{h}. 34^{m}. till 4^{h}. 57^{m}., and again from 6^{h}. 0^{m}. till 6^{h}. 43^{m}.: the value at 7^{h}. 29^{m}. for Vertical Force has been inferred.

Greenwich Mean Solar Time.	Western Declination.	Excess of Western Declination above 17°, converted into Westerly Force, and expressed in terms of Gauss's Unit measured on the Metrical System.
Jan. 31 h m	° ′ ″	
15. 3	18. 25. 25	·0448
15. 11	26. 0	·0452
15. 28	33. 0	·0488
15. 36	33. 10	·0489
15. 59	31. 50	·0482
16. 14	31. 45	·0482
16. 24	30. 35	·0476
16. 54	33. 40	·0492
17. 8	31. 20	·0480
	***	
17. 50	29. 55	·0472
18. 18	30. 40	·0477
18. 27	30. 0	·0473
18. 46	31. 0	·0478
19. 10	29. 50	·0471
19. 13	30. 50	·0477
19. 18	29. 50	·0471
19. 25	31. 0	·0478
19. 35	29. 25	·0469
19. 40	30. 30	·0476
19. 50	30. 35	·0476
19. 56	28. 50	·0466
20. 26	30. 0	·0473
20. 56	28. 20	·0464
21. 18	29. 30	·0470
21. 42	28. 30	·0465
22. 6	29. 30	·0470
22. 21	28. 55	·0467
22. 38	29. 30	·0470
22. 42	28. 50	·0466
23. 59	34. 30	·0497
Sept. 12		
0. 0	18. 31. 20	·0480
0. 30	33. 45	·0492
0. 44	33. 25	·0490
0. 48	34. 0	·0494
0. 52	33. 15	·0489
1. 10	38. 35	·0518
1. 19	37. 10	·0510
1. 29	38. 30	·0518
1. 46	36. 55	·0509
1. 57	40. 35	·0528
2. 5	39. 15	·0521
2. 10	41. 55	·0535
2. 34	41. 45	·0534
2. 41	35. 20	·0501
2. 47	35. 55	·0504
2. 52	34. 25	·0496
3. 3	37. 5	·0509
3. 12	34. 45	·0498
3. 19	36. 0	·0504
3. 32	33. 10	·0489
3. 37	18. 33. 50	·0492
3. 41	33. 15	·0489
3. 50	34. 0	·0494
4. 14	31. 35	·0481
4. 24	31. 30	·0481
4. 46	29. 25	·0469
5. 30	29. 20	·0469
6. 1	26. 10	·0453
6. 12	21. 0	·0425
6. 17	21. 40	·0429
6. 46	11. 25	·0375
7. 6	12. 50	·0382
7. 16	11. 20	·0375
7. 20	12. 0	·0378
7. 30	11. 20	·0375
7. 46	16. 0	·0399
7. 50	15. 25	·0396
7. 57	17. 0	·0404
8. 6	16. 20	·0401
8. 24	7. 25	·0354
8. 43	18. 0	·0410
8. 52	12. 0	·0378
9. 4	27. 5	·0457
9. 26	2. 30	·0329
9. 39	7. 45	·0356
9. 42	7. 15	·0353
9. 54	18. 11. 10	·0374
10. 19	17. 54. 40	·0288
10. 43	18. 24. 5	·0441
10. 50	19. 35	·0418
10. 56	19. 55	·0420
11. 5	6. 0	·0347
11. 19	16. 0	·0399
11. 28	10. 55	·0373
11. 40	15. 25	·0396
12. 0	9. 20	·0364
12. 24	26. 50	·0456
12. 54	0. 30	·0318
13. 19	8. 25	·0359
13. 23	8. 20	·0359
13. 47	14. 0	·0389
14. 3	21. 55	·0430
14. 19	17. 25	·0406
14. 23	20. 10	·0421
14. 29	18. 0	·0410
14. 39	17. 20	·0406
14. 44	21. 0	·0425
14. 58	14. 50	·0393
15. 7	17. 0	·0404
15. 25	17. 30	·0407
15. 34	19. 0	·0415
15. 39	17. 55	·0409
15. 49	21. 50	·0429

Greenwich Mean Solar Time.	Horizontal Force (diminished by a Constant) uncorrected for Temperature. Expressed in parts of the whole Horizontal Force.	Expressed in terms of Gauss's Unit measured on the Metrical System.
Jan. 31 h m		
15. 36	·1242	·2242
15. 46	·1239	·2236
16. 16	·1248	·2252
16. 20	·1247	·2251
16. 37	·1254	·2263
17. 2	·1248	·2252
	***	
17. 46	·1255	·2265
18. 24	·1252	·2260
18. 48	·1260	·2274
19. 7	·1256	·2267
19. 15	·1258	·2270
19. 36	·1243	·2243
19. 39	·1248	·2252
19. 54	·1240	·2238
20. 6	·1247	·2251
20. 8	·1244	·2245
20. 26	·1248	·2252
20. 38	·1246	·2249
21. 6	·1254	·2263
21. 43	·1253	·2261
22. 38	·1258	·2270
23. 59	·1254	·2263
Sept. 12		
0. 0	·1395	·2518
0. 3	·1396	·2520
0. 12	·1400	·2527
0. 40	·1399	·2525
0. 45	·1403	·2532
0. 53	·1398	·2523
1. 10	·1420	·2563
1. 19	·1410	·2545
1. 27	·1415	·2554
1. 49	·1398	·2523
1. 57	·1412	·2549
2. 3	·1404	·2534
2. 10	·1409	·2543
2. 20	·1404	·2534
2. 24	·1409	·2543
2. 27	·1403	·2532
2. 32	·1411	·2547
2. 42	·1383	·2496
2. 48	·1387	·2504
2. 52	·1379	·2489
3. 3	·1383	·2496
3. 16	·1363	·2460
3. 26	·1368	·2469
3. 31	·1365	·2464
3. 37	·1377	·2486
3. 40	·1376	·2484
3. 51	·1386	·2502
3. 57	·1383	·2496
4. 21	·1400	·2527
4. 34	·1396	·2520
5. 20	·1410	·2545
5. 30	·1406	·2538
5. 40	·1424	·2570
5. 56	·1407	·2540
6. 6	·1397	·2522
6. 14	·1377	·2486
6. 25	·1386	·2502
6. 40	·1395	·2518
6. 44	·1393	·2514
6. 55	·1400	·2527
6. 57	·1398	·2523
7. 3	·1402	·2531
7. 15	·1391	·2511
7. 17	·1393	·2514
7. 27	·1388	·2505
7. 34	·1391	·2511
7. 49	·1379	·2489
8. 7	·1389	·2507
8. 20	·1402	·2531
8. 30	·1424	·2570
8. 50	·1391	·2511
8. 59	·1408	·2541
9. 12	·1363	·2460
9. 32	·1400	·2527
9. 47	·1372	·2477
10. 10	·1363	·2460
10. 19	·1368	·2469
10. 21	·1365	·2464
10. 36	·1401	·2529
10. 53	·1357	·2450
11. 0	·1336	·2412
11. 18	·1395	·2518
11. 28	·1378	·2487
11. 44	·1396	·2520
11. 51	·1384	·2498
11. 56	·1388	·2505
11. 59	·1384	·2498
12. 5	·1388	·2505
12. 19	·1357	·2450
12. 25	·1363	·2460
12. 40	·1336	·2412
13. 16	·1396	·2520
13. 22	·1389	·2507

Greenwich Mean Solar Time.	Vertical Force (diminished by a Constant) uncorrected for Temperature. Expressed in parts of the whole Vertical Force.	Expressed in terms of Gauss's Unit measured on the Metrical System.
h m		
Sept. 12		
0. 0	·0293	·1281
0. 49	·0296	·1294
1. 11	·0298	·1303
1. 18	·0297	·1299
1. 30	·0299	·1307
1. 45	·0298	·1303
1. 55	·0302	·1321
2. 5	·0301	·1316
2. 10	·0302	·1321
2. 20	·0302	·1321
2. 31	·0304	·1329
2. 40	·0302	·1321
3. 36	·0305	·1334
3. 55	·0306	·1338
4. 16	·0307	·1343
4. 45	·0306	·1338
5. 25	·0307	·1343
5. 38	·0309	·1351
5. 52	·0308	·1347
6. 3	·0311	·1360
6. 8	·0310	·1356
6. 35	·0314	·1373
7. 50	·0310	·1356
8. 20	·0314	·1373
8. 23	·0314	·1373
8. 45	·0293	·1281
9. 0	·0294	·1285
9. 8	·0291	·1272
9. 25	·0295	·1290
9. 42	·0291	·1272
10. 0	·0291	·1272
10. 22	·0283	·1238
10. 32	·0285	·1247
10. 40	·0280	·1225
10. 58	·0279	·1220
11. 11	·0286	·1251
11. 20	·0288	·1260
11. 27	·0287	·1256
11. 50	·0288	·1260
12. 18	·0280	·1225
12. 23	·0280	·1225
12. 46	·0264	·1154
13. 15	·0282	·1234
13. 25	·0283	·1238
14. 0	·0289	·1264
14. 35	·0289	·1264
15. 5	·0292	·1277
15. 40	·0293	·1281
16. 6	·0292	·1277
17. 28	·0297	·1299
18. 5	·0285	·1247
18. 9	·0286	·1251
18. 17	·0279	·1220
18. 25	·0281	·1229
18. 36	·0275	·1203
19. 0	·0279	·1220
19. 10	·0273	·1194
19. 15	·0272	·1190
19. 21	·0269	·1176
19. 35	·0275	·1203
19. 40	·0272	·1190
19. 56	·0279	·1220
20. 5	·0275	·1203
20. 10	·0277	·1212
20. 18	·0280	·1225
20. 37	·0280	·1225
21. 28	·0289	·1264
21. 41	·0288	·1260
22. 12	·0294	·1285
22. 35	·0297	·1299
22. 55	·0299	·1307
23. 2	·0302	·1321
23. 5	·0301	·1316

Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
Jan. 31 h m	°	°
0. 0	61·0	60·0
1. 0	61·2	60·2
2. 0	61·0	60·1
3. 0	61·0	60·1
9. 0	61·0	60·0
21. 0	60·3	60·0
22. 0	60·2	60·0
23. 0	60·1	60·0
24. 0	60·0	60·0
Sept. 12		
0. 0	65·7	65·1
1. 0	65·7	65·1
2. 0	65·6	65·1
3. 0	65·5	65·1
9. 0	66·1	65·3

Greenwich Mean Solar Time.	Western Declination.	Excess of Western Declination above 17°, converted into Westerly Force, and expressed in terms of Gauss's Unit measured on the Metrical System.	Greenwich Mean Solar Time.	Horizontal Force (diminished by a Constant) uncorrected for Temperature. Expressed in parts of the whole Horizontal Force.	Expressed in terms of Gauss's Unit measured on the Metrical System.	Greenwich Mean Solar Time.	Vertical Force (diminished by a Constant) uncorrected for Temperature. Expressed in parts of the whole Vertical Force.	Expressed in terms of Gauss's Unit measured on the Metrical System.
Sept. 12			Sept. 12			Sept. 12		
h m	° ′ ″		h m			h m		
16. 7	18. 17. 35	·0407	13. 36	·1393	·2514	23. 20	·0306	·1338
16. 18	17. 20	·0406	13. 54	·1379	·2489	23. 27	·0305	·1334
16. 22	16. 5	·0399	13. 58	·1382	·2495	23. 42	·0306	·1338
16. 29	17. 30	·0407	14. 3	·1378	·2487	23. 59	·0304	·1329
16. 35	16. 35	·0402	14. 22	·1402	·2531			
16. 40	18. 20	·0412	14. 39	·1392	·2513			
16. 48	17. 20	·0406	14. 45	·1402	·2531			
16. 53	18. 25	·0412	14. 49	·1396	·2520			
16. 56	17. 30	·0407	15. 3	·1408	·2541			
17. 13	21. 20	·0427	15. 15	·1404	·2534			
17. 25	21. 5	·0425	15. 21	·1408	·2541			
17. 41	29. 0	·0467	15. 25	·1405	·2536			
17. 47	25. 30	·0449	15. 28	·1408	·2541			
17. 54	27. 50	·0461	15. 38	·1402	·2531			
17. 56	26. 25	·0454	15. 46	·1406	·2538			
18. 4	31. 45	·0482	15. 53	·1398	·2523			
18. 8	30. 45	·0477	15. 55	·1405	·2536			
18. 14	39. 25	·0522	15. 59	·1399	·2525			
18. 19	36. 15	·0505	16. 7	·1403	·2532			
18. 27	42. 10	·0537	16. 45	·1396	·2520			
18. 40	36. 45	·0508	16. 48	·1400	·2527			
19. 1	59. 10	·0626	16. 54	·1396	·2520			
19. 7	55. 55	·0609	16. 59	·1399	·2525			
19. 12	59. 5	·0625	17. 10	·1396	·2520			
19. 24	40. 45	·0529	17. 26	·1414	·2552			
19. 33	44. 20	·0548	17. 52	·1339	·2417			
19. 43	36. 30	·0507	17. 57	·1346	·2430			
19. 55	54. 40	·0603	18. 6	·1332	·2405			
20. 5	44. 35	·0549	18. 10	·1342	·2423			
20. 11	44. 45	·0550	18. 15	·1329	·2399			
20. 20	55. 30	·0607	18. 19	·1347	·2432			
20. 26	52. 0	·0588	18. 24	·1341	·2421			
20. 30	53. 0	·0593	18. 27	·1348	·2433			
20. 40	44. 20	·0548	18. 37	·1308	·2361			
20. 47	42. 10	·0537	18. 49	·1288	·2324			
20. 50	43. 0	·0541	19. 2	·1314	·2372			
21. 0	41. 0	·0530	19. 10	·1280	·2310			
21. 9	43. 50	·0545	19. 15	·1287	·2323			
21. 10	41. 55	·0535	19. 18	·1272	·2296			
21. 29	48. 50	·0571	19. 25	·1287	·2323			
21. 47	42. 40	·0540	19. 30	·1276	·2303			
22. 5	39. 30	·0523	19. 32	·1285	·2319			
22. 10	40. 35	·0528	19. 39	·1254	·2263			
22. 35	33. 40	·0492	19. 54	·1306	·2358			
22. 47	37. 20	·0511	20. 3	·1274	·2299			
22. 55	33. 55	·0493		(†)				
23. 2	36. 0	·0504	20. 16	·1274	·2299			
23. 8	32. 50	·0487	20. 22	·1292	·2332			
23. 16	32. 0	·0483	20. 31	·1280	·2310			
23. 22	33. 25	·0490	20. 47	·1311	·2367			
23. 37	30. 0	·0473	21. 2	·1298	·2342			
23. 59	29. 35	·0470		***				
			21. 54	·1324	·2390			

Greenwich Mean Solar Time.	Western Declination.	Excess of Western Declination above 17°, converted into Westerly Force, and expressed in terms of Gauss's Unit measured on the Metrical System.	Greenwich Mean Solar Time.	Horizontal Force (diminished by a Constant) uncorrected for Temperature. Expressed in parts of the whole Horizontal Force.	Expressed in terms of Gauss's Unit measured on the Metrical System.	Greenwich Mean Solar Time.	Vertical Force (diminished by a Constant) uncorrected for Temperature. Expressed in parts of the whole Vertical Force.	Expressed in terms of Gauss's Unit measured on the Metrical System.
h m	° ′ ″		Sept. 12					
			h m					
			22. 6	·1317	·2378			
			22. 12	·1330	·2401			
			22. 17	·1323	·2388			
			22. 24	·1332	·2405			
			22. 27	·1328	·2397			
			22. 42	·1364	·2462			
			22. 47	·1359	·2453			
			22. 50	·1364	·2462			
			22. 52	·1357	·2450			
			23. 3	·1382	·2495			
			23. 5	·1351	·2439			
			23. 20	·1386	·2502			
			23. 29	·1374	·2480			
			23. 46	·1397	·2522			
			23. 50	·1390	·2509			
			23. 59	·1405	·2536			
Sept. 13			Sept. 13			Sept. 13		
0. 0	18. 29. 30	·0470	0. 0	·1405	·2536	0. 0	·0304	·1329
0. 9	28. 25	·0464	0. 10	·1392	·2513	1. 1	·0303	·1325
0. 18	29. 30	·0470	0. 19	·1398	·2523	1. 6	·0307	·1343
0. 24	28. 40	·0466	0. 26	·1394	·2516	1. 18	·0304	·1329
0. 30	29. 30	·0470	0. 29	·1398	·2523	1. 33	·0308	·1347
0. 37	29. 5	·0467	0. 36	·1392	·2513	1. 36	·0306	·1338
0. 47	30. 30	·0476	0. 40	·1397	·2522	1. 44	·0310	·1356
0. 56	30. 40	·0477	0. 44	·1388	·2505	1. 52	·0305	·1334
1. 0	30. 5	·0473	0. 48	·1398	·2523	2. 3	·0310	·1356
1. 10	36. 20	·0506	0. 56	·1388	·2505	2. 6	·0310	·1356
1. 18	33. 40	·0492	1. 10	·1432	·2585	2. 13	·0313	·1369
1. 22	33. 35	·0491	1. 27	·1375	·2482	2. 30	·0310	·1356
1. 30	37. 40	·0513	1. 37	·1408	2541	2. 36	·0313	·1369
1. 37	35. 0	·0499	1. 40	·1379	·2489	2. 46	·0311	·1360
1. 45	40. 0	·0525	1. 46	·1401	·2529	3. 3	·0313	·1369
1. 53	34. 5	·0494	1. 48	·1389	·2507	3. 36	·0310	·1356
2. 3	38. 25	·0517	1. 50	·1410	·2545	3. 40	·0312	·1365
2. 10	37. 30	·0512	1. 57	·1361	·2457	3. 46	·0311	·1360
2. 21	46. 25	·0559	2. 6	·1376	·2484	3. 50	·0315	·1378
2. 32	39. 20	·0522	2. 14	·1378	·2487	3. 57	·0311	·1360
2. 38	38. 40	·0519	2. 17	·1393	·2514	4. 8	·0321	·1404
2. 52	31. 40	·0482	2. 20	·1386	·2502	4. 16	·0318	·1391
3. 8	30. 5	·0473	2. 25	·1391	·2511	4. 30	·0320	·1400
3. 24	29. 30	·0470	2. 35	·1342	·2423	4. 36	·0319	·1395
3. 32	27. 25	·0459	2. 40	·1356	·2448	5. 18	·0332	·1452
3. 37	28. 20	·0464	2. 49	·1335	·2410	5. 27	·0332	·1452
3. 45	28. 10	·0463	3. 6	·1354	·2444	6. 3	·0341	·1491
3. 52	33. 0	·0488	3. 22	·1362	·2459	6. 15	·0338	·1478
3. 57	29. 0	·0467	3. 29	·1371	·2475	6. 18	·0339	·1482
4. 7	36. 30	·0507	3. 37	·1358	·2451	6. 31	·0335	·1465
4. 13	32. 45	·0487	3. 48	·1376	·2484	6. 40	·0337	·1474
4. 26	37. 50	·0513	3. 50	·1371	·2475	6. 48	·0333	·1456
4. 32	36. 30	·0507	3. 56	·1413	·2550	6. 53	·0335	·1465
4. 40	37. 45	·0513	3. 59	·1379	·2489	6. 57	·0332	·1452
4. 43	37. 5	·0509	4. 16	·1444	·2606	7. 3	·0334	·1460

The indications are taken from the sheets of the Photographic Record. The Symbol *** denotes that the magnet has been generally in a state of slight agitation, and the Symbol (†) that the register has failed between the preceding and following readings.

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

The constant by which the values of Horizontal Force are diminished is 0·8600 nearly, as expressed in parts of the whole Horizontal Force, equivalent to 1·5523 in terms of Gauss's Unit measured on the Metrical (Millimètre-Milligramme-Second) system. The corresponding constant for Vertical Force is 0·9600 nearly, equivalent to 4·1989 in terms of Gauss's Unit. To express the Metrical measures on the C.G.S. (Centimètre-Gramme-Second) system, the numbers must be divided by 10, equivalent to shifting the decimal point one step towards the left.

September 12. The value at $19^h. 39^m$. for Horizontal Force has been inferred: from $20^h. 3^m$. till $20^h. 16^m$. the Horizontal Force spot of light was off the sheet in the direction of *decreasing* force.

September 13. The value for Western Declination at $6^h. 59^m$. is somewhat uncertain on account of faintness of the photographic trace.

Greenwich Mean Solar Time.	Western Declination.	Excess of Western Declination above 17°, converted into Westerly Force, and expressed in terms of Gauss's Unit measured on the Metrical System.
Sept. 13 h m	° ′ ″	
4.47	18. 37. 50	·0513
4.55	37. 40	·0513
4.59	40. 0	·0525
5.22	31. 25	·0485
5.32	31. 50	·0482
5.40	31. 5	·0478
5.48	33. 30	·0491
5.55	26. 30	·0455
6. 3	33. 40	·0492
6.16	25. 40	·0450
6.22	26. 40	·0456
6.28	25. 20	·0448
6.34	26. 25	·0454
6.40	23. 30	·0439
6.48	18. 27. 55	·0462
6.59	17. 57. 10	·0300
7. 5	18. 17. 20	·0406
7.18	1. 5	·0320
7.32	26. 20	·0454
7.41	12. 55	·0383
8. 0	28. 0	·0462
8.10	19. 5	·0415
8.24	25. 5	·0446
8.27	24. 0	·0441
8.30	25. 50	·0450
9. 0	24. 55	·0446
9. 7	38. 30	·0518
9.17	20. 20	·0422
9.21	22. 50	·0433
9.27	20. 0	·0420
9.33	19. 55	·0420
9.40	22. 10	·0432
9.45	19. 35	·0418
9.49	20. 50	·0424
9.55	16. 55	·0404
9.59	17. 40	·0408
10. 8	15. 20	·0396
10.23	4. 10	·0337
10.37	11. 20	·0373
10.40	12. 50	·0382
10.46	11. 0	·0373
11. 2	12. 30	·0381
11.10	10. 30	·0371
11.16	11. 40	·0377
11.21	11. 5	·0373
11.26	12. 25	·0380
11.31	11. 45	·0377
11.46	17. 35	·0407
12.15	14. 55	·0394
12.28	16. 20	·0401
12.42	20. 55	·0425
12.49	19. 0	·0415

Greenwich Mean Solar Time.	Horizontal Force (diminished by a Constant) uncorrected for Temperature. Expressed in parts of the whole Horizontal Force.	Expressed in terms of Gauss's Unit measured on the Metrical System.
Sept. 13 h m		
4.28	·1408	·2541
4.33	·1415	·2554
4.39	·1406	·2538
4.56	·1425	·2572
5.10	·1407	·2540
5.19	·1409	·2543
5.28	·1396	·2520
5.34	·1397	·2522
5.40	·1392	·2513
5.51	·1396	·2520
5.58	·1390	·2509
6. 6	·1417	·2558
6.16	·1387	·2504
6.21	·1389	·2507
6.30	·1379	·2489
6.40	·1396	·2520
6.44	·1392	·2513
6.47	·1402	·2531
6.50	·1394	·2516
6.55	·1398	·2523
7. 1	·1353	·2442
7. 8	·1416	·2556
7.16	·1370	·2473
7.32	·1414	·2552
7.44	·1354	·2444
7.54	·1382	·2495
8. 6	·1347	·2432
8.20	·1366	·2466
8.28	·1360	·2455
8.47	·1368	·2469
8.51	·1364	·2462
9. 7	·1396	·2520
9.17	·1344	·2426
9.23	·1367	·2468
9.28	·1362	·2459
9.44	·1372	·2477
9.48	·1368	·2469
9.56	·1376	·2484
10.19	·1356	·2448
10.30	·1370	·2473
10.39	·1364	·2462
10.44	·1366	·2466
10.50	·1361	·2457
	***	
11.11	·1353	·2442
11.19	·1362	·2459
11.21	·1358	·2451
11.25	·1362	·2459
11.32	·1358	·2451
11.40	·1365	·2464
11.50	·1360	·2455
12. 2	·1370	·2473

Greenwich Mean Solar Time.	Vertical Force (diminished by a Constant) uncorrected for Temperature. Expressed in parts of the whole Vertical Force.	Expressed in terms of Gauss's Unit measured on the Metrical System.
Sept. 13 h m		
7.15	·0323	·1413
7.20	·0324	·1417
7.27	·0321	·1404
7.30	·0322	·1409
7.38	·0316	·1382
7.50	·0319	·1395
8. 5	·0316	·1382
8.15	·0319	·1395
8.25	·0319	·1395
9. 4	·0328	·1435
9.14	·0322	·1409
9.23	·0326	·1426
9.30	·0326	·1426
9.42	·0329	·1439
9.49	·0329	·1439
10.15	·0323	·1413
10.25	·0323	·1413
10.35	·0322	·1409
10.42	·0322	·1409
10.50	·0319	·1395
11.39	·0320	·1400
12.10	·0317	·1387
12.44	·0317	·1387
13. 4	·0314	·1373
13.12	·0316	·1382
13.24	·0312	·1365
13.36	·0312	·1365
15.48	·0310	·1356
16.50	·0310	·1356
18.12	·0309	·1351
21.20	·0302	·1321
22.25	·0303	·1325
23. 6	·0302	·1321
23.59	·0303	·1325

Greenwich Mean Solar Time.	Western Declination.	Excess of Western Declination above 17°, converted into Westerly Force, and expressed in terms of Gauss's Unit measured on the Metrical System.
Sept. 13 h m	° ′ ″	
12.53	18. 21. 0	·0425
13. 2	19. 50	·0419
13.13	26. 0	·0452
13.27	20. 55	·0425
13.40	22. 35	·0434
14. 6	21. 25	·0427
14.16	22. 20	·0433
14.23	21. 55	·0430
14.33	23. 40	·0440
14.38	23. 0	·0436
14.48	24. 45	·0445
14.56	23. 30	·0439
15.20	24. 35	·0444
15.28	23. 50	·0440
15.33	25. 55	·0451
15.50	23. 0	·0436
16.10	24. 0	·0441
16.20	22. 55	·0436
16.32	23. 30	·0439
16.44	25. 20	·0448
17. 2	24. 10	·0442
17. 8	25. 10	·0447
17.13	24. 10	·0442
17.20	25. 0	·0446
17.30	24. 30	·0444
17.36	23. 30	·0439
17.39	25. 0	·0446
17.43	24. 45	·0445
17.47	25. 35	·0449
17.52	23. 35	·0439
18.35	24. 35	·0444
18.47	23. 35	·0439
19. 5	25. 20	·0448
19.20	24. 0	·0441
19.25	25. 20	·0448
19.30	24. 35	·0444
19.46	25. 0	·0446
19.52	23. 35	·0439
20.10	24. 50	·0445
20.58	25. 0	·0446
21.10	24. 10	·0442
21.15	25. 30	·0449
21.18	23. 5	·0436
21.22	25. 50	·0450
21.28	23. 35	·0439
21.40	25. 40	·0450
22.11	25. 0	·0446
22.32	26. 40	·0456
22.50	25. 50	·0450
23. 5	27. 5	·0457
23.30	26. 45	·0456
23.59	29. 55	·0472

Greenwich Mean Solar Time.	Horizontal Force (diminished by a Constant) uncorrected for Temperature. Expressed in parts of the whole Horizontal Force.	Expressed in terms of Gauss's Unit measured on the Metrical System.
Sept. 13 h m		
12.19	·1366	·2466
12.28	·1367	·2468
12.38	·1375	·2482
12.43	·1372	·2477
12.46	·1378	·2487
12.51	·1369	·2471
12.55	·1374	·2480
13. 4	·1365	·2464
13.15	·1391	·2511
13.26	·1374	·2480
13.36	·1383	·2496
14. 6	·1371	·2475
14.36	·1372	·2477
14.55	·1365	·2464
15.21	·1373	·2478
15.31	·1371	·2475
15.40	·1375	·2482
15.54	·1369	·2471
16.12	·1376	·2484
16.21	·1373	·2478
	***	
17.38	·1379	·2489
17.40	·1375	·2482
17.46	·1380	·2491
17.48	·1375	·2482
17.50	·1379	·2489
17.57	·1374	·2480
18.49	·1374	·2480
19. 5	·1376	·2484
19.47	·1376	·2484
19.53	·1373	·2478
20.12	·1377	·2486
21.11	·1372	·2477
21.24	·1382	·2495
21.29	·1375	·2482
21.40	·1378	·2487
21.54	·1374	·2480
22. 5	·1376	·2484
22.18	·1372	·2477
22.37	·1377	·2486
22.52	·1372	·2477
23. 6	·1377	·2486
23.14	·1372	·2477
23.59	·1381	·2493

Greenwich Mean Solar Time.	Vertical Force (diminished by a Constant) uncorrected for Temperature. Expressed in parts of the whole Vertical Force.	Expressed in terms of Gauss's Unit measured on the Metrical System.
h m		

Greenwich Mean Solar Time.	Readings of Thermometers. Of H.F. Magnet.	Of V.F. Magnet.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H.F. Magnet.	Of V.F. Magnet.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H.F. Magnet.	Of V.F. Magnet.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H.F. Magnet.	Of V.F. Magnet.
Sept. 12 h m	°	°	Sept. 13 h m	°	°	Sept. 13 h m	°	°	Sept. 13 h m	°	°
21. 0	65·0	64·7	0. 0	65·3	65·0	3. 0	66·1	65·6	22. 0	66·0	65·2
22. 0	65·1	64·7	1. 0	65·6	65·3	9. 0	67·0	66·0	23. 0	66·2	65·3
23. 0	65·1	64·8	2. 0	66·0	65·5	21. 0	65·9	65·1	24. 0	66·2	65·5

ROYAL OBSERVATORY, GREENWICH.

RESULTS

OF

OBSERVATIONS

OF THE

MAGNETIC DIP.

1881.

RESULTS of OBSERVATIONS of MAGNETIC DIP, on each Day of Observation.

Day and Approximate Hour, 1881.		Needle.	Length of Needle.	Magnetic Dip.	Observer.
	d h			° ′ ″	
January	4. 2	D 1	3 inches	67. 34. 11	N
	6. 2	D 2	3 ,,	67. 35. 42	N
	15. 1	C 1	6 ,,	67. 36. 27	N
	22. 1	C 2	6 ,,	67. 35. 13	N
	25. 0	D 1	3 ,,	67. 36. 3	N
	25. 2	B 1	9 ,,	67. 32. 58	N
	26. 2	D 2	3 ,,	67. 36. 52	N
	31. 1	B 2	9 ,,	67. 35. 19	N
	31. 2	B 1	9 ,,	67. 38. 40	N
February	3. 2	D 1	3 ,,	67. 37. 27	N
	12. 1	C 2	6 ,,	67. 35. 28	N
	16. 2	D 2	3 ,,	67. 37. 15	N
	19. 2	C 1	6 ,,	67. 36. 38	N
	23. 2	B 1	9 ,,	67. 35. 12	N
	24. 1	B 2	9 ,,	67. 34. 22	N
	24. 2	D 1	3 ,,	67. 35. 36	N
	25. 1	B 2	9 ,,	67. 34. 33	N
	25. 2	C 2	6 ,,	67. 36. 8	N
	25. 3	C 1	6 ,,	67. 35. 42	N
	28. 2	B 1	9 ,,	67. 35. 19	N
March	8. 0	C 2	6 ,,	67. 35. 29	N
	8. 1	D 2	3 ,,	67. 35. 54	N
	10. 2	C 1	6 ,,	67. 34. 15	N
	15. 2	D 1	3 ,,	67. 35. 47	N
	16. 2	B 2	9 ,,	67. 34. 28	N
	18. 1	C 1	6 ,,	67. 35. 29	N
	18. 2	D 2	3 ,,	67. 35. 28	N
	23. 2	B 1	9 ,,	67. 34. 37	N
	25. 1	B 2	9 ,,	67. 34. 20	N
	25. 2	C 2	6 ,,	67. 35. 52	N
	30. 0	C 1	6 ,,	67. 35. 20	N
	30. 2	D 1	3 ,,	67. 35. 18	N
April	4. 2	C 2	6 ,,	67. 33. 56	N
	7. 2	D 2	3 ,,	67. 35. 33	N
	8. 2	B 1	9 ,,	67. 34. 53	N
	18. 1	D 1	3 ,,	67. 34. 55	N
	20. 1	B 2	9 ,,	67. 34. 10	N
	21. 0	C 1	6 ,,	67. 34. 12	N
	21. 1	D 1	3 ,,	67. 34. 29	N
	21. 2	D 2	3 ,,	67. 35. 38	N
	28. 1	C 2	6 ,,	67. 35. 37	N
	28. 2	C 1	6 ,,	67. 35. 19	N
	28. 23	B 1	9 ,,	67. 33. 28	N
	29. 2	D 2	3 ,,	67. 34. 40	N
May	5. 23	B 2	9 ,,	67. 33. 1	N
	6. 0	C 2	6 ,,	67. 34. 10	N
	6. 2	B 1	9 ,,	67. 33. 17	N
	12. 2	C 1	6 ,,	67. 33. 45	N
	13. 0	D 1	3 ,,	67. 35. 29	N
	13. 2	B 2	9 ,,	67. 33. 42	N
	21. 1	D 2	3 ,,	67. 33. 23	N
	24. 0	B 1	9 ,,	67. 34. 10	N
	24. 1	B 2	9 ,,	67. 34. 4	N

Day and Approximate Hour, 1881.		Needle.	Length of Needle.	Magnetic Dip.	Observer.
	d h			° ′ ″	
May	24. 2	D 2	3 inches	67. 34. 10	N
	30. 3	D 1	3 ,,	67. 32. 58	N
	31. 0	D 1	3 ,,	67. 35. 18	N
June	3. 3	C 1	6 ,,	67. 32. 14	N
	9. 2	C 2	6 ,,	67. 34. 10	N
	10. 1	C 1	6 ,,	67. 34. 40	N
	10. 2	D 2	3 ,,	67. 34. 38	N
	16. 2	D 1	3 ,,	67. 36. 55	N
	21. 2	B 1	9 ,,	67. 33. 18	N
	22. 2	B 2	9 ,,	67. 32. 9	N
	29. 2	B 2	9 ,,	67. 33. 7	N
	29. 3	D 1	3 ,,	67. 33. 46	N
	29. 23	B 1	9 ,,	67. 34. 43	N
	30. 2	D 2	3 ,,	67. 34. 23	N
July	5. 0	C 2	6 ,,	67. 35. 37	N
	5. 2	C 1	6 ,,	67. 34. 58	N
	12. 0	B 2	9 ,,	67. 33. 28	N
	14. 1	B 1	9 ,,	67. 33. 39	N
	15. 2	B 2	9 ,,	67. 33. 20	N
	21. 2	D 1	3 ,,	67. 33. 37	N
	26. 2	D 1	3 ,,	67. 35. 23	N
	27. 1	D 2	3 ,,	67. 33. 46	N
	27. 23	C 2	6 ,,	67. 36. 45	N
	28. 1	D 2	3 ,,	67. 36. 27	N
	28. 23	D 1	3 ,,	67. 35. 48	N
August	9. 0	C 1	6 ,,	67. 33. 54	N
	9. 2	C 2	6 ,,	67. 34. 40	N
	16. 2	B 1	9 ,,	67. 32. 58	N
	18. 2	C 2	6 ,,	67. 34. 12	N
	19. 2	D 2	3 ,,	67. 33. 58	N
	22. 2	D 1	3 ,,	67. 33. 58	N
	25. 22	B 2	9 ,,	67. 34. 48	N
	26. 0	B 1	9 ,,	67. 33. 10	N
	26. 2	C 1	6 ,,	67. 33. 43	N
	30. 0	B 2	9 ,,	67. 33. 5	N
	30. 2	C 2	6 ,,	67. 33. 30	N
	30. 23	B 1	9 ,,	67. 34. 14	N
	31. 2	D 2	3 ,,	67. 34. 23	N
September	1. 1	C 1	6 ,,	67. 34. 40	N
	6. 0	B 1	9 ,,	67. 32. 48	N
	6. 2	B 2	9 ,,	67. 32. 0	N
	9. 1	C 2	6 ,,	67. 35. 0	N
	9. 2	D 2	3 ,,	67. 34. 44	N
	16. 2	D 1	3 ,,	67. 35. 3	N
	20. 1	B 2	9 ,,	67. 32. 6	N
	22. 1	C 1	6 ,,	67. 35. 27	N
	22. 2	C 2	6 ,,	67. 34. 20	N
	28. 0	B 1	9 ,,	67. 33. 50	N
	28. 2	B 2	9 ,,	67. 33. 30	N
	29. 1	C 2	6 ,,	67. 35. 19	N
	30. 0	D 2	3 ,,	67. 35. 30	N
	30. 2	C 1	6 ,,	67. 33. 59	N

The initial N is that of Mr. Nash.

RESULTS of OBSERVATIONS of MAGNETIC DIP, on each Day of Observation—*concluded.*

Day and Approximate Hour, 1881.	Needle.	Length of Needle.	Magnetic Dip.	Observer.
d h			° ′ ″	
October 4. 2	C 2	6 inches	67. 33. 46	N
5. 2	B 1	9 ,,	67. 30. 56	N
12. 0	C 1	6 ,,	67. 35. 32	N
13. 0	B 1	9 ,,	67. 34. 52	N
13. 2	B 2	9 ,,	67. 34. 38	N
19. 1	C 1	6 ,,	67. 35. 54	N
19. 2	C 2	6 ,,	67. 35. 33	N
26. 0	D 2	3 ,,	67. 34. 37	N
26. 2	D 1	3 ,,	67. 33. 57	N
31. 2	C 1	6 ,,	67. 35. 36	N
November 5. 1	D 1	3 ,,	67. 35. 59	N
11. 2	C 1	6 ,,	67. 33. 45	N
16. 2	C 2	6 ,,	67. 34. 47	N
17. 2	B 1	9 ,,	67. 34. 28	N
18. 1	B 2	9 ,,	67. 34. 39	N
18. 2	D 2	3 ,,	67. 34. 44	N
24. 1	D 2	3 ,,	67. 34. 50	N
November 26. 0	B 1	9 inches	67. 32. 6	N
26. 1	B 2	9 ,,	67. 32. 28	N
29. 0	C 2	6 ,,	67. 34. 53	N
30. 1	D 1	3 ,,	67. 33. 37	N
December 2. 1	C 1	6 ,,	67. 34. 49	N
6. 1	D 1	3 ,,	67. 35. 23	N
6. 2	D 2	3 ,,	67. 35. 28	N
13. 1	B 1	9 ,,	67. 31. 55	N
13. 2	B 2	9 ,,	67. 33. 6	N
20. 2	C 2	6 ,,	67. 35. 39	N
22. 1	B 1	9 ,,	67. 33. 47	N
22. 23	C 1	6 ,,	67. 33. 35	N
23. 2	C 2	6 ,,	67. 35. 29	N
29. 0	B 2	9 ,,	67. 32. 58	N
29. 2	D 1	3 ,,	67. 35. 49	N
30. 2	D 2	3 ,,	67. 35. 2	N

The initial **N** is that of Mr. Nash.

MONTHLY MEANS OF MAGNETIC DIP.

Month, 1881.	B 1, 9-inch Needle.	Number of Observations.	B 2, 9-inch Needle.	Number of Observations.	C 1, 6-inch Needle.	Number of Observations.
	° ′ ″		° ′ ″		° ′ ″	
January	67. 35. 49	2	67. 35. 19	1	67. 36. 27	1
February	67. 35. 15	2	67. 34. 28	2	67. 36. 10	2
March	67. 34. 37	1	67. 34. 24	2	67. 35. 1	3
April	67. 34. 10	2	67. 34. 10	1	67. 34. 45	2
May	67. 33. 43	2	67. 33. 36	3	67. 33. 45	1
June	67. 34. 0	2	67. 32. 38	2	67. 33. 27	2
July	67. 33. 39	1	67. 33. 24	2	67. 34. 58	1
August	67. 33. 27	3	67. 33. 57	2	67. 33. 48	2
September	67. 33. 19	2	67. 32. 32	3	67. 34. 42	3
October	67. 32. 54	2	67. 34. 38	1	67. 35. 41	3
November	67. 33. 17	2	67. 33. 33	2	67. 33. 45	1
December	67. 32. 51	2	67. 33. 2	2	67. 34. 12	2
Means	67. 33. 53	Sum 23	67. 33. 37	Sum 23	67. 34. 47	Sum 23

Month, 1881.	C 2, 6-inch Needle.	Number of Observations.	D 1, 3-inch Needle.	Number of Observations.	D 2, 3-inch Needle.	Number of Observations.
	° ′ ″		° ′ ″		° ′ ″	
January	67. 35. 13	1	67. 35. 7	2	67. 36. 17	2
February	67. 35. 48	2	67. 36. 31	2	67. 37. 15	1
March	67. 35. 40	2	67. 35. 33	2	67. 35. 41	2
April	67. 34. 47	2	67. 34. 42	2	67. 35. 17	3
May	67. 34. 10	1	67. 34. 35	3	67. 33. 47	2
June	67. 34. 10	1	67. 35. 20	2	67. 34. 30	2
July	67. 36. 11	2	67. 34. 56	3	67. 35. 6	2
August	67. 34. 7	3	67. 33. 58	1	67. 34. 10	2
September	67. 34. 53	3	67. 35. 3	1	67. 35. 7	2
October	67. 34. 39	2	67. 33. 57	1	67. 34. 37	1
November	67. 34. 40	2	67. 34. 48	2	67. 34. 47	2
December	67. 35. 34	2	67. 35. 36	2	67. 35. 15	2
Means	67. 35. 1	Sum 23	67. 35. 5	Sum 23	67. 35. 5	Sum 23

For this table the monthly means have been formed without reference to the hour at which the observation was made on each day.
In combining the monthly results, to form the annual means, weights have been given proportional to the number of observations.

YEARLY MEANS of MAGNETIC DIP for each of the NEEDLES, and GENERAL MEAN for the Year 1881.

Lengths of the several Sets of Needles.	Needles.	Number of Observations with each Needle.	Mean Yearly Dip from Observations with each Needle.	Mean Yearly Dip from each Set of Needles.	Mean Yearly Dip from all the Sets of Needles.
			° ′ ″	° ′ ″	° ′ ″
9-inch Needles	B 1	23	67. 33. 53	67. 33. 45	67. 34. 35
	B 2	23	67. 33. 37		
6-inch Needles	C 1	23	67. 34. 47	67. 34. 54	
	C 2	23	67. 35. 1		
3-inch Needles	D 1	23	67. 35. 5	67. 35. 5	
	D 2	23	67. 35. 5		

ROYAL OBSERVATORY, GREENWICH.

OBSERVATIONS

OF

DEFLEXION OF A MAGNET

FOR

ABSOLUTE MEASURE

OF

HORIZONTAL FORCE.

1881.

ABSTRACT of the OBSERVATIONS of DEFLEXION of a MAGNET for ABSOLUTE MEASURE of HORIZONTAL FORCE.

Month and Day, 1881.		Distances of Centres of Magnets.	Temperature.	Observed Deflexion.	Mean of the Times of Vibration of Deflecting Magnet.	Number of Vibrations.	Temperature.	Observer.
		ft.	°	° ′ ″	s		°	
January	28	1·0 1·3	39·6	10. 47. 56 4. 54. 2	5·630 5·630	100 100	38·9 40·1	N
February	26	1·0 1·3	46·8	10. 47. 15 4. 53. 39	5·631 5·635	100 100	47·1 48·9	N
March	29	1·0 1·3	53·1	10. 45. 39 4. 52. 46	5·632 5·632	100 100	53·4 57·8	N
April	29	1·0 1·3	57·9	10. 44. 49 4. 52. 36	5·635 5·635	100 100	58·8 59·2	N
May	31	1·0 1·3	78·9	10. 41. 58 4. 51. 14	5·640 5·643	100 100	79·1 81·4	N
June	30	1·0 1·3	73·2	10. 43. 12 4. 51. 46	5·634 5·644	100 100	74·9 75·5	N
July	29	1·0 1·3	73·1	10. 42. 11 4. 51. 26	5·638 5·643	100 100	73·4 74·3	N
August	31	1·0 1·3	59·5	10. 44. 3 4. 52. 9	5·645 5·639	100 100	59·3 59·5	N
September	27	1·0 1·3	61·4	10. 43. 35 4. 51. 52	5·633 5·634	100 100	58·4 64·9	N
October	29	1·0 1·3	46·3	10. 44. 21 4. 52. 25	5·638 5·638	100 100	45·1 47·4	N
November	29	1·0 1·3	50·4	10. 44. 51 4. 52. 29	5·648 5·643	100 100	53·1 51·3	N
December	23	1·0 1·3	36·3	10. 45. 30 4. 52. 49	5·645 5·640	100 100	36·9 38·0	N

The Deflecting Magnet is placed on the East side of the suspended Magnet, with its marked pole alternately E. and W., and it is placed on the West side with its pole alternately E. and W.; and the deflexion in the table above is the mean of the four deflexions observed in those positions of the magnets.

The lengths of 1 foot and 1·3 foot correspond to 304·8 and 396·2 millimètres respectively.

The initial N is that of Mr. Nash.

In the following calculations every observation is reduced to the temperature 35°.

COMPUTATION of the VALUES of ABSOLUTE MEASURE of HORIZONTAL FORCE in the Year 1881.

Month and Day, 1881.		In English Measure.									In Metric Measure.
		Apparent Value of A_1.	Apparent Value of A_2.	Apparent Value of P.	Mean Value of P.	Log. $\frac{m}{X}$	Adopted Time of Vibration of Deflecting Magnet.	Log. m X.	Value of m.	Value of X.	Value of X.
							s				
January	28	0·09374	0·09389	−0·00400	−0·00312	8·97336	5·6300	0·15819	0·3679	3·912	1·804
February	26	0·09376	0·09389	−0·00338		8·97337	5·6330	0·15827	0·3680	3·912	1·804
March	29	0·09363	0·09370	−0·00186		8·97265	5·6320	0·15894	0·3680	3·919	1·807
April	29	0·09358	0·09373	−0·00378		8·97261	5·6350	0·15873	0·3678	3·918	1·807
May	31	0·09352	0·09364	−0·00305		8·97227	5·6415	0·15921	0·3679	3·922	1·808
June	30	0·09361	0·09371	−0·00282		8·97262	5·6390	0·15857	0·3678	3·917	1·806
July	29	0·09346	0·09360	−0·00384		8·97202	5·6405	0·15825	0·3674	3·918	1·807
August	31	0·09350	0·09361	−0·00288		8·97214	5·6420	0·15700	0·3669	3·912	1·804
September	27	0·09346	0·09355	−0·00226		8·97192	5·6335	0·15844	0·3674	3·920	1·807
October	29	0·09333	0·09348	−0·00395		8·97145	5·6380	0·15672	0·3665	3·914	1·805
November	29	0·09347	0·09357	−0·00265		8·97197	5·6455	0·15592	0·3664	3·908	1·802
December	23	0·09334	0·09345	−0·00293		8·97141	5·6425	0·15540	0·3659	3·908	1·802
Means		..	..	..	..	..	..	..	..	3·915	1·805

The value of X in column 10 is referred to the unit Foot-Grain-Second, and that in column 11 to the unit Millimètre-Milligramme-Second. To obtain X in the Centimètre-Gramme-Second (C.G.S.) unit, the value given in column 11 must be divided by 10, equivalent to shifting the decimal point one step towards the left.

ROYAL OBSERVATORY, GREENWICH.

RESULTS

OF

METEOROLOGICAL OBSERVATIONS.

1881.

Month and Day. 1881.	Phases of the Moon.	Barometer. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	Temperature. Of the Air. Highest.	Temperature. Of the Air. Lowest.	Temperature. Of the Air. Daily Range.	Temperature. Of the Air. Mean of 24 Hourly Values.	Temperature. Of the Air. Excess of Mean above Average of 20 Years.	Temperature. Of Evaporation. Mean of 24 Hourly Values.	Temperature. Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Difference. Greatest of 24 Hourly Values.	Difference. Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	Temperature. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Temperature. Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	hours.	hours.	in.		
Jan. 1	..	30·166	42·2	32·0	10·2	37·4	− 0·7	36·3	34·8	2·6	4·6	1·5	90	50·2	28·0	0·0	7·9	0·000	4·0	ssP
2	..	30·220	43·1	40·8	2·3	42·2	+ 4·3	41·1	39·8	2·4	4·2	1·1	91	44·2	38·0	0·0	7·9	0·000	0·0	mP : sP
3	..	30·15[illegible]	43·4	38·0	5·4	40·7	+ 2·9	39·1	37·1	3·6	6·4	0·7	87	52·8	30·8	0·3	7·9	0·000	0·0	mP : ssP
4	..	30·094	41·6	35·3	6·3	38·8	+ 1·1	37·0	34·6	4·2	5·7	1·5	85	46·4	30·3	0·0	7·9	0·000	0·0	sP : ssP
5	In Equator	30·082	43·4	35·7	7·7	39·6	+ 2·0	37·6	35·0	4·6	8·8	1·6	84	65·3	30·9	2·1	7·9	0·000	5·8	wP : sP
6	..	30·236	41·1	33·8	7·3	36·9	− 0·7	34·4	30·8	6·1	10·8	3·6	79	68·3	29·6	5·4	8·0	0·000	2·2	mP : sP
7	First Qr.	30·395	41·4	30·8	10·6	35·1	− 2·5	33·3	30·5	4·6	8·1	2·3	82	76·8	25·4	5·7	8·0	0·000	2·2	sP
8	..	30·352	38·4	30·2	8·2	33·9	− 3·8	32·3	29·5	4·4	7·8	2·8	84	50·9	25·6	0·0	8·0	0·000	6·8	— : ssP
9	..	30·143	38·5	33·0	5·5	35·1	− 2·6	33·7	31·5	3·6	9·1	0·8	86	61·4	30·7	0·4	8·1	0·000	0·0	ssP
10	..	29·862	34·2	33·0	1·2	33·7	− 4·1	32·2	29·5	4·2	8·1	2·0	85	38·5	29·6	0·0	8·1	0·000	0·0	vP
11	..	29·614	34·1	30·5	3·6	32·7	− 5·2	31·1	27·8	4·9	8·1	1·6	82	36·4	29·5	0·0	8·1	0·001	0·0	sP : vP
12	Greatest Declination N	29·343	31·7	23·0	8·7	29·2	− 8·9	28·0	23·9	5·3	9·8	0·9	79	47·8	20·0	2·2	8·2	0·130	0·0	vP, vN : sP
13	..	29·406	32·8	19·5	13·3	26·4	−11·8	25·6	21·8	4·6	5·1	0·0	83	41·2	18·8	0·0	8·2	0·000	0·0	..
14	Apogee	29·658	25·3	15·0	10·3	21·7	−16·6	21·4	19·5	2·2	4·4	0·0	93	35·2	14·0	0·0	8·2	0·000	0·0	..
15	Full	29·606	24·8	14·0	10·8	19·8	−18·6	19·5	17·3	2·5	9·4	0·0	92	41·8	12·6	1·2	8·3	0·000	0·0	..
16	..	29·635	24·6	17·7	6·9	21·6	−16·9	21·1	17·9	3·7	9·5	0·0	86	34·1	13·5	0·0	8·3	0·000	0·0	..
17	..	29·593	31·1	12·7	18·4	23·0	−15·6	21·6	12·8	10·2	13·5	1·7	63	59·8	11·3	1·1	8·3	0·000	2·0	..
18	..	29·070	30·4	26·2	4·2	28·4	−10·4	27·3	23·1	5·3	14·6	0·0	80	32·1	24·8	0·0	8·4	0·848	6·5	..
19	In Equator	29·092	29·7	25·5	4·2	27·3	−11·6	27·0	25·8	1·5	3·8	0·0	94	31·7	25·0	0·0	8·4	0·111	1·5	..
20	..	29·65[illegible]	25·5	14·4	11·1	21·1	−18·0	20·6	17·3	3·8	7·7	0·0	84	32·4	10·2	0·0	8·5	0·000	0·0	..
21	..	30·018	29·2	15·8	13·4	21·7	−17·6	21·1	17·3	4·4	10·8	0·0	83	83·0	10·7	5·8	8·5	0·000	0·0	..
22	..	30·031	31·7	17·3	14·4	23·3	−16·2	22·9	20·5	2·8	7·3	0·0	89	31·7	12·0	0·0	8·6	0·000	0·0	..
23	Last Qr.	30·026	35·1	30·0	5·1	32·0	− 7·6	30·8	28·0	4·0	7·3	0·8	84	41·6	24·0	0·0	8·6	0·000	0·0	..
24	..	30·08[illegible]	30·0	23·3	6·7	25·9	−13·8	25·8	25·3	0·6	2·8	0·0	97	36·3	21·2	0·0	8·7	0·000	0·0	..
25	..	29·820	31·2	16·8	14·4	23·9	−15·9	23·2	19·4	4·5	10·6	0·0	82	78·8	15·5	2·1	8·7	0·000	3·0	..
26	Greatest Declination S	29·470	35·3	13·2	22·1	23·3	−16·6	22·8	19·8	3·5	4·3	0·0	86	36·1	11·5	0·0	8·8	0·118	1·0	..
27	..	29·11[illegible]	43·3	35·3	8·0	38·2	− 1·8	37·9	37·5	0·7	3·9	0·0	98	58·2	31·9	0·0	8·8	0·073	0·0	..
28	..	28·947	42·1	34·9	7·2	37·7	− 2·4	37·4	37·0	0·7	2·2	0·0	97	51·0	34·0	0·0	8·9	0·084	1·5	..
29	Perigee	28·8[illegible]	48·1	42·1	6·0	44·7	+ 4·5	43·6	42·4	2·3	4·0	0·7	92	54·9	37·0	0·0	8·9	0·221	5·3	..
30	New	28·98[illegible]	48·7	41·9	6·8	44·8	+ 4·5	43·7	42·5	2·3	5·5	0·0	92	60·6	37·0	0·3	9·0	0·067	4·8	..
31	..	29·35[illegible]	50·0	34·8	15·2	41·5	+ 1·1	39·5	37·0	4·5	12·0	0·0	85	99·8	28·8	5·2	9·0	0·010	6·5	..
Means	..	29·712	36·2	27·3	8·9	31·7	− 7·1	30·6	28·0	3·7	7·4	0·8	86·3	50·9	23·9	1·0	8·4	Sum 1·663	1·7	..
Number of Column for Reference	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers. The results on January 7 and 8 for Air and Evaporation Temperatures depend partly on values inferred from eye-observations, on account of accidental loss of photographic register.

The values given in Columns 3, 4, 5, 14, and 15, are derived from eye-readings of self-registering thermometers.

January 18. Violent snow-storm, with heavy gale of wind. The amount entered as rain (column 18) was estimated by afterwards ascertaining the average depth of snow on the ground, and making corresponding allowance.

The Electrometer was not in action from January 13 to 31.

The mean reading of the *Barometer* for the month was 29in·712, being 0in·017 *lower* than the average for the 20 years, 1854–1873.

Temperature of the Air.

The highest in the month was 50°·0 on January 31; the lowest in the month was 12°·7 on January 17; and the range was 37°·3.
The mean of all the highest daily readings in the month was 36°·2, being 7°·0 *lower* than the average for the 40 years, 1841–1880.
The mean of all the lowest daily readings in the month was 27°·3, being 6°·3 *lower* than the average for the 40 years, 1841–1880.
The mean daily range was 8°·9, being 0°·7 *less* than the average for the 40 years, 1841–1880.
The mean for the month was 31°·7, being 7°·1 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1881.	Wind as deduced from Self-registering Anemometers. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	Clouds and Weather. A.M.	P.M.
			lbs.	lbs.	lbs.	miles.		
Jan. 1	WSW	SW : WSW	0·0	0·0	0·0	233	p.-cl : 10, th.-cl	10 : 10
2	SW	SE	0·0	0·0	0·0	68	10 : 10, f	10, f : 10, slt.-f
3	SE	ENE	0·0	0·0	0·0	107	10, f : 10, f	6, cu.-s, ci.-cu, th.-cl: p.-cl, cu.-s
4	ENE : NE	NNE : NE	0·3	0·0	0·0	197	10 : 7, cu.-s	10 : 0, d
5	NE	NE	14·0	0·0	1·0	517	p.-cl : 5, ci.-cu, ci	4,cu.-s,ci.-s,sc: 0, d : v, st.-w
6	ENE	ENE	19·0	0·0	2·5	571	w : 1, ci, w	2, ci, st.-w : 1, li.-cl
7	ENE	ENE:NE:NNE	4·0	0·0	0·1	295	0, ho.-fr : 0	0 : 0, ho.-fr
8	NE : NNE	N : NNE	2·3	0·0	0·0	267	ho.-fr : 10	7, cu.-s, ci : 10 : 10
9	NNE	NNE	0·6	0·0	0·0	221	p.-cl : 7, cu.-s	7, ci, cu.-s : 10
10	NNE : N	W : NNW : N	0·2	0·0	0·0	170	10 : 10, glm	10, glm : 10, slt.-r
11	NNW	W : SW	0·0	0·0	0·0	175	10, slt.-sn : 10, slt.-sn	9, glm : 10, sn, glm
12	SW : NNW : W	WSW	1·0	0·0	0·0	278	10, sn : 8, th.-cl	1, th.-cl, ci.-cu : v, th.-cl, ho.-fr
13	WSW : NNW	N	0·0	0·0	0·0	225	ho.-fr : 10, f, glm	10, glm, sn : li.-cl : 1, ho.-fr, m
14	N : NE	N : SW	0·0	0·0	0·0	95	0, m, ho.-fr : 10, f	10, f : 0, tk.-f
15	SW : WSW	WSW : SW	0·0	0·0	0·0	158	tk.-f, ho.-fr : 3, li.-cl, m, ho.-fr	0, slt.-f : 5, cu.-s, ho.-fr
16	WSW	SW	0·0	0·0	0·0	203	10 : 0, m, ho.-fr, f	0, f : 0, slt.-m, ho.-fr
17	SSW : S : E	E	10·0	0·0	0·2	233	0, ho.-fr : 2, ci, s, f, ho.-fr	5,th.-cl,so.-ha: 10 : 10
18	E : ENE	ENE	51·5	0·5	10·4	860	10, st.-w : 10, sn, hy.-g	10, sn, hy.-g : 10, sn, st.-w
19	NE	NNE : N	7·0	0·0	0·8	566	10, slt.-sn : 10, slt.-sn	10, slt.-sn : 10, sn
20	NNW : WSW	SW : SE : E	3·5	0·0	0·1	217	v : 4, th.-cl, f	5, cu.-s, f, m, glm : 0, f
21	ENE	E : NE	1·2	0·0	0·0	221	0, ho.-fr : 0, ho.-fr	1, li.-cl, cu : 0 : 8, th.-cl
22	NNE: N: WSW	WSW : N	1·0	0·0	0·0	152	p.-cl, ho.-fr : 10, f, slt.-sn	9, ci.-cu, th.-cl, f, oc.-sn: 10
23	N	N	0·0	0·0	0·0	156	10, slt.-sn : 10, slt.-f, slt.-sn	10 : 10
24	NE : ENE	ESE	0·0	0·0	0·0	73	10 : 10, f	10, slt.-f, ho.-fr : 10
25	E : ENE	ENE : NE	1·3	0·0	0·0	249	10 : 7, cu.-s, ci.-cu	6, cu.-s, ci.-cu : 0, ho.-fr, m
26	NE	NE : E : SE	0·7	0·0	0·0	135	0, ho.-fr : 7, ho.-fr	10 : 10, sn, sl, r
27	SSE	SSW : SSE	0·0	0·0	0·0	190	10, r : 10, m.-r, f	10, f : 10, slt.-f, th.-r
28	NE: NNW: SW	SW : S	0·0	0·0	0·0	206	10, f : 10, f, m.-r	10 : v, oc.-slt.-r
29	SSE : S : SSW	SSW : SW	8·0	0·0	0·7	392	10 : 10, fq.-r	10, sc, fq.-r : 10, oc.-shs
30	WSW: SW: SSW	S : SSE : WSW	2·6	0·0	0·1	268	10 : 6, cu.-s, ci.-cu	9,cu.-s,ci.-cu, fq.-shs: v, shs.-r
31	WSW : SW	SSW : SSE	2·0	0·0	0·0	229	v : 0	4,ci,ci.-cu,cu.-s: 0, a : m, f, ho.-fr
Means	...	...	..	..	0·5	256		
Number of Column for Reference.	21	22	23	24	25	26	27	28

The mean *Temperature of Evaporation* for the month was 30°·6, being 6°·8 *lower* than the average for the 20 years, 1849–1868.
The mean *Temperature of the Dew Point* for the month was 28°·0, being 7°·4 *lower* than the average for the 20 years, 1849–1868.
The mean *Degree of Humidity* for the month was 86·3, being 1·0 *less* than the average for the 20 years, 1849–1868.
The mean *Elastic Force of Vapour* for the month was 0in·153, being 0in·054 *less* than the average for the 20 years, 1849–1868.
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 1gr·8, being 0gr·6 *less* than the average for the 20 years, 1849–1868.
The mean *Weight of a Cubic Foot of Air* for the month was 561 grains, being 9 grains *greater* than the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 6·8.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·12. The maximum daily amount of *Sunshine* was 5·8 hours on January 21.

The highest reading of the *Solar Radiation Thermometer* was 99°·8 on January 31; and the lowest reading of the *Terrestrial Radiation Thermometer* was 10°·2 on January 20.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 1·1; for the 6 hours ending 3 p.m., 0·4; and for the 6 hours ending 9 p.m., 0·2.

The *Proportions of Wind* referred to the cardinal points were N. 10, E. 9, S. 6, and W. 6.

The *Greatest Pressure of the Wind* in the month was 51lbs·5 on the square foot on January 18. The mean daily *Horizontal Movement of the Air* for the month was 256 miles; the greatest daily value was 860 miles on January 18; and the least daily value 68 miles on January 2.

Rain fell on 9 days in the month, amounting to 1in·663, as measured by gauge No. 6 partly sunk below the ground; being 0in·409 *less* than the average fall for the 40 years, 1841–1880.

MONTH and DAY, 1881.	Phases of the Moon.	Barometer. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	Temperature. Of the Air. Highest.	Temperature. Of the Air. Lowest.	Temperature. Of the Air. Daily Range.	Temperature. Of the Air. Mean of 24 Hourly Values.	Temperature. Of the Air. Excess of Mean above Average of 20 Years.	Temperature. Of Evaporation. Mean of 24 Hourly Values.	Temperature. Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Difference. Greatest of 24 Hourly Values.	Difference. Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	Temperature. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Temperature. Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	hours.	hours.	in.		
Feb. 1	In Equator	29·667	37·6	32·5	5·1	35·1	− 5·4	35·1	35·1	0·0	0·5	0·0	100	45·0	30·2	0·0	9·1	0·007	1·0	. .
2	. .	29·603	49·1	32·4	16·7	41·9	+ 1·3	41·2	40·4	1·5	3·6	0·0	94	55·3	32·4	0·0	9·2	0·078	6·5	— : mP, wN
3	. .	29·472	54·0	46·4	7·6	48·9	+ 8·2	47·4	45·7	3·2	5·3	1·3	89	69·5	44·0	0·0	9·2	0·015	9·5	wP
4	. .	29·274	49·5	44·5	5·0	47·0	+ 6·3	45·1	43·0	4·0	5·7	0·8	87	50·0	40·2	0·0	9·3	0·010	7·5	wP : mP
5	. .	29·269	45·4	37·2	8·2	42·7	+ 2·1	40·0	36·7	6·0	11·9	2·9	80	68·0	35·0	0·8	9·3	0·027	11·5	mP, sN : vP, vN
6	First Qr.	29·705	40·1	28·7	11·4	35·8	− 4·6	33·0	28·8	7·0	9·9	3·1	74	64·0	27·7	3·9	9·4	0·000	0·0	sP
7	. .	29·656	46·3	26·1	20·2	34·3	− 5·9	33·1	31·1	3·2	7·5	1·1	87	46·3	25·6	0·0	9·4	0·353	2·0	sP : vP, vN
8	Greatest Declination N	29·101	50·9	41·9	9·0	46·2	+ 6·3	42·7	38·7	7·5	10·7	2·6	76	82·0	38·1	1·8	9·5	0·042	6·0	wP, wN : vP, wN
9	. .	29·464	44·9	39·0	5·9	42·3	+ 2·7	39·7	36·5	5·8	8·8	0·7	81	73·2	37·2	2·7	9·6	0·235	2·0	mP : mP, sN
10	Apogee	28·887	51·1	39·2	11·9	46·4	+ 7·1	43·9	41·1	5·3	13·4	1·1	83	84·7	30·8	1·7	9·6	0·113	7·2	wP, wN : mP, sN
11	. .	29·110	41·5	33·5	8·0	37·8	− 1·3	35·6	32·6	5·2	9·8	0·7	82	69·3	30·0	1·0	9·7	0·030	9·8	vP, vN : sP
12	. .	29·830	41·1	28·3	12·8	34·5	− 4·4	31·9	27·6	6·9	11·0	3·4	75	63·3	24·5	4·0	9·8	0·000	0·8	sP
13	. .	29·846	40·4	27·0	13·4	34·4	− 4·4	32·1	28·2	6·2	10·1	0·5	77	54·3	25·2	0·0	9·8	0·000	6·8	sP
14	Full	29·590	39·4	36·0	3·4	37·4	− 1·3	35·4	32·6	4·8	8·2	1·2	83	50·7	33·8	0·0	9·9	0·273	11·5	mP : mP, wN
15	. .	29·611	43·8	33·5	10·3	38·7	0·0	37·8	36·6	2·1	5·5	0·0	93	63·0	27·8	0·2	9·9	0·220	0·0	vP : ssP
16	In Equator	29·731	46·1	31·1	15·0	38·3	− 0·5	37·4	36·2	2·1	5·1	0·0	93	61·8	26·6	0·0	10·0	0·002	0·0	sP
17	. .	29·757	41·8	32·7	9·1	37·2	− 1·7	37·1	37·0	0·2	0·9	0·0	99	51·2	29·5	0·0	10·1	0·000	0·0	mP
18	. .	29·863	46·7	39·3	7·4	41·8	+ 2·8	41·2	40·5	1·3	5·1	0·0	95	57·1	37·3	0·0	10·1	0·004	1·5	mP
19	. .	29·964	40·5	36·3	4·2	37·9	− 1·3	37·5	36·9	1·0	1·7	0·0	96	43·0	36·0	0·0	10·2	0·020	4·5	wP : vP, wN
20	. .	29·99[illegible]	38·1	33·8	4·3	37·0	− 2·3	36·9	36·8	0·2	1·0	0·0	99	42·0	32·5	0·0	10·3	0·222	0·0	wN : wN : ssP, ssN
21	Last Qr.	30·071	34·0	30·3	3·7	33·0	− 6·5	32·6	31·8	1·2	2·9	0·0	95	50·5	29·5	0·0	10·3	0·280	0·0	ssP, ssN : mP : sP
22	Greatest Declination S	29·991	35·9	30·5	5·4	32·9	− 6·7	32·6	32·2	0·7	2·3	0·0	97	38·9	28·1	0·0	10·4	0·010	0·0	sP : wN, vP : sP
23	. .	30·022	35·1	32·2	2·9	33·4	− 6·3	33·1	32·6	0·8	2·7	0·0	97	43·8	31·0	0·0	10·5	0·488	0·0	mP : ssP, ssN
24	. .	30·094	40·1	32·4	7·7	35·4	− 4·4	34·1	32·1	3·3	6·5	0·0	88	72·8	31·5	0·6	10·5	0·000	3·3	sP
25	. .	29·960	38·5	30·3	8·2	35·2	− 4·7	32·9	29·3	5·9	8·9	2·6	78	50·0	23·7	0·0	10·6	0·000	3·7	mP : mP, wN
26	Perigee	29·692	44·8	27·1	17·7	35·6	− 4·4	33·0	29·0	6·6	12·8	1·4	76	102·5	23·5	6·3	10·7	0·000	1·0	sP
27	. .	29·663	39·7	29·1	10·6	33·5	− 6·6	32·1	29·6	3·9	8·2	0·4	85	85·0	26·1	2·4	10·7	0·015	0·0	mP : sP
28	New	29·602	34·7	27·3	7·4	30·7	− 9·5	29·5	26·2	4·5	10·8	0·0	82	54·7	23·8	0·7	10·8	0·000	0·0	mP : sP
Means	. .	29·661	42·5	33·5	9·0	38·0	− 1·6	36·6	34·5	3·6	6·8	0·8	87·2	61·7	30·9	0·9	9·9	Sum 2·446	3·4	. .
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers. The results on February 6 and 7 for Evaporation Temperature depend partly on values inferred from eye-observations, on account of accidental loss of photographic register.

The values given in Columns 3, 4, 5, 14, and 15 are derived from eye-readings of self-registering thermometers.

The Electrometer was not in action on February 1.

The mean reading of the *Barometer* for the month was 29in·661, being 0in·171 *lower* than the average for the 20 years, 1854–1873.

Temperature of the Air.

The highest in the month was 54°·0 on February 3; the lowest in the month was 26°·1 on February 7; and the range was 27°·9.

The mean of all the highest daily readings in the month was 42°·5, being 3°·0 *lower* than the average for the 40 years, 1841–1880.

The mean of all the lowest daily readings in the month was 33°·5, being 0°·8 *lower* than the average for the 40 years, 1841–1880.

The mean daily range was 9°·0, being 2°·1 *less* than the average for the 40 years, 1841–1880.

The mean for the month was 38°·0, being 1°·6 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY. 1881.	WIND AS DEDUCED FROM SELF-REGISTERING ANEMOMETERS. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	CLOUDS AND WEATHER. A.M.	P.M.
			lbs.	lbs.	lbs.	miles.		
Feb. 1	WSW : SW	SW	0·0	0·0	0·0	131	10, f : 10, f	10, f : 10, f
2	SSE	SSW	5·0	0·0	0·2	311	10 : 10, se, oc.-th.-r	10, th.-r : v
3	SSW	S : SSE	2·1	0·0	0·3	368	10 : 10	9, se, m.-r : 10, r
4	SSE : S : SSW	SSW : SW	2·5	0·0	0·1	364	10 : 10, oc.-m.-r	10 : v : v, slt.-r
5	SW : W	WSW : NW	7·1	0·0	0·9	513	p.-cl : p.-cl, shs.-r, glm	9,cu.-s,ci.-cu,shs.-r : 10, li.-shs
6	NNW	NNW : SW	6·0	0·0	0·9	371	10 : 1, ci	4, ci.-cu, ci : 0, ho.-fr, m
7	S : SSE	S : SSW : SW	18·0	0·0	2·0	480	0, m, ho.-fr : 10, slt.-sn	10, sn, w : 10, r, st.-w : v, w, fq.-shs
8	WSW	WSW : W : WNW	28·0	0·0	6·9	958	v, st.-w : 10, se, g	7,ci,ci.-s,cu.-s,st.-w : v, li.-shs
9	W : NW	NNW : SE	5·2	0·0	0·5	369	p.-cl : 2, th.-cl	7,ci.-cu,cu.-s : 10, r : 10, fq.-r
10	SW	WSW	26·0	0·1	4·3	773	10, r : 10, r	10, n, se, st.-w : 10, shs.-r, lu.-ha
11	SW : NNE	N : NNW	21·0	0·0	1·8	466	shs.-r : 10, slt.-r, glm	9, se, cu.-s, ci.-cu, oc.-sn : 1, li.-cl, oc.-sn
12	NNW	N : NNE : S	2·9	0·0	0·5	289	p.-cl : 1, ci.-cu, cu.-s	6, ci.-cu, cu.-s, cu : 3, th.-cl, m, lu.-ha
13	SSE	S : SSE	5·1	0·0	0·1	277	th.-cl, m, ho.-fr : 6, ci.-cu, ci.-s, ci	10 : 10, slt.-sn
14	SSE : SE	SE : SSE	7·4	0·0	0·4	296	10 : 10, slt.-r	10, r : 10, fq.-r
15	SSE : SE	ESE : Calm	0·0	0·0	0·0	117	10, c.-r : 10, c.-r	9, cu.-s, ci.-cu : 1, cu.-s, f
16	Calm	E : ESE	0·0	0·0	0·0	109	f : 10, f	9, slt.-f : v : 0
17	Calm : ENE : E	ENE : E : Calm	0·0	0·0	0·0	79	0 : 10, f	10, slt.-f : 10, lk.-f : 10, f
18	ESE : Calm	NE : ENE	0·0	0·0	0·0	74	10, f : 10, f	10 : 10
19	ENE : NE	NE : NNE	0·5	0·0	0·0	243	10 : 10, m.-r	10 : 10 : 10, r
20	NNE : NE	NE	1·8	0·0	0·1	331	10, r : 10	10, hy.-sh : 10 : 10, sh.-r
21	NE	N	1·2	0·0	0·0	319	10, sn : 10, sn, sl	10 : 10 : v
22	NW : W	NE : N	0·0	0·0	0·0	163	10 : 10, glm, m.-r, f	10, slt.-f, m.-r : 10 : 10
23	N : NNE	NNE	0·0	0·0	0·0	212	10 : 10, sn, sl	10, sn : 10, sn
24	NNE	NNE	1·4	0·0	0·0	287	10 : 10	9, ci.-cu, cu.-s : 10
25	NNE : NE	NE : N : SW	0·0	0·0	0·0	169	10 : 10	10 : v, ho.-fr : 10, slt.-f
26	SW	SSW : SSE : ESE	0·0	0·0	0·0	160	10 : 3, ci.-cu, ho.-fr	3, ci, ci.-cu : 10 : 10
27	ENE : NE	ENE : NE : N	3·5	0·0	0·1	227	10 : 10, sn	10, sn : v, th.-cl, ho.-fr
28	N : NNW	N : NNW	1·5	0·0	0·1	253	p.-cl : 10, oc.-sn	8, cu, cu.-s, oc.-sn : 0
Means	...	...	..	..	0·7	311		
Number of Column for Reference.	21	22	23	24	25	26	27	28

The mean *Temperature of Evaporation* for the month was 36°·6, being 1°·3 *lower* than
The mean *Temperature of the Dew Point* for the month was 34°·5, being 0°·9 *lower* than
The mean *Degree of Humidity* for the month was 87·2, being 2·4 *greater* than
The mean *Elastic Force of Vapour* for the month was 0in·199, being 0in·008 *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 2grs·3, being 0gr·1 *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 552 grains, being 2 grains *less* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 8·5.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·09. The maximum daily amount of *Sunshine* was 6·5 hours on February 26.

The highest reading of the *Solar Radiation Thermometer* was 102°·5 on February 26; and the lowest reading of the *Terrestrial Radiation Thermometer* was 23°·2 on February 13.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 2·5; for the 6 hours ending 3 p.m., 0·4; and for the 6 hours ending 9 p.m., 0·5.

The *Proportions of Wind* referred to the cardinal points were N. 8, E. 6, S. 7, and W. 5. Two days were calm.

The *Greatest Pressure of the Wind* in the month was 28lbs·0 on the square foot on February 8. The mean daily *Horizontal Movement of the Air* for the month was 311 miles; the greatest daily value was 958 miles on February 8; and the least daily value 74 miles on February 18.

Rain fell on 18 days in the month, amounting to 2in·446, as measured by gauge No. 6 partly sunk below the ground; being 0in·979 *greater* than the average fall for the 40 years, 1841–1880.

MONTH and DAY. 1881.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Of the Air. Lowest.	Of the Air. Daily Range.	Of the Air. Mean of 24 Hourly Values.	Of the Air. Excess of Mean above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Greatest of 24 Hourly Values.	Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	hours.	hours.	in.		
Mar. 1	In Equator	29·894	40·6	24·7	15·9	32·0	− 8·3	30·2	26·0	6·0	11·3	0·0	77	86·2	21·1	4·4	10·8	0·000	1·2	sP : vP
2	..	30·066	44·0	29·7	14·3	34·8	− 5·6	32·6	29·0	5·8	13·2	1·5	79	93·0	25·0	1·5	10·9	0·000	5·5	sP
3	..	29·886	38·9	32·9	6·0	36·6	− 3·9	34·1	30·5	6·1	9·2	3·1	79	52·0	29·1	0·0	11·0	0·000	7·0	sP
4	..	29·376	48·1	36·4	11·7	41·5	+ 1·0	41·0	40·4	1·1	6·7	0·0	96	51·5	33·6	0·0	11·1	0·425	6·8	wP, vN : vP, wN
5	..	29·238	57·6	45·2	12·4	49·8	+ 9·3	48·9	48·0	1·8	7·8	0·0	94	84·2	42·3	0·0	11·1	0·768	15·0	wP, wN
6	..	29·236	58·0	47·7	10·3	51·7	+ 11·2	49·9	48·1	3·6	10·2	0·8	88	105·0	38·6	4·0	11·2	0·002	6·5	wP
7	[illegible]	29·133	58·3	47·3	11·0	52·1	+ 11·5	50·0	47·9	4·2	9·7	0·2	85	100·6	44·0	4·2	11·2	0·054	13·5	wP : wP, wN
8	..	29·506	50·0	41·2	8·8	45·7	+ 5·1	43·0	39·9	5·8	10·7	1·7	81	86·5	37·0	1·9	11·3	0·165	3·2	mP, wN
9	..	29·762	53·6	40·6	13·0	48·2	+ 7·5	46·2	44·0	4·2	7·2	0·6	86	69·6	35·7	0·0	11·4	0·044	5·3	wP
10	Apogee	29·866	59·4	50·0	9·4	52·9	+ 12·2	50·5	48·1	4·8	8·0	2·2	84	98·7	47·2	0·7	11·4	0·000	0·0	wP
11	..	29·885	58·2	44·0	14·2	51·0	+ 10·2	48·3	45·5	5·5	11·8	1·7	82	100·0	38·0	5·6	11·5	0·000	0·0	wP : vP
12	..	29·832	54·5	39·5	15·0	45·4	+ 4·6	44·5	43·5	1·9	7·2	0·0	93	65·2	32·2	0·0	11·6	0·000	0·0	mP
13	..	29·774	51·3	38·3	13·0	42·4	+ 1·5	41·3	40·0	2·4	8·0	0·0	91	99·3	36·9	1·1	11·6	0·000	1·5	mP
14	..	29·728	48·9	36·0	12·9	42·1	+ 1·1	39·6	36·5	5·6	10·7	1·2	81	100·0	31·0	5·8	11·7	0·000	4·5	mP
15	In Equator Full	30·038	54·7	33·3	21·4	42·1	+ 1·0	39·9	37·2	4·9	14·4	0·0	84	105·8	29·3	6·2	11·8	0·000	2·0	mP
16	..	30·210	59·8	29·4	30·4	43·7	+ 2·5	40·6	37·0	6·7	16·3	0·0	77	98·4	26·8	8·1	11·8	0·000	0·0	mP : sP
17	..	30·328	56·2	34·4	21·8	44·8	+ 3·5	42·6	40·0	4·8	11·6	0·0	84	75·7	28·0	4·1	11·9	0·000	0·0	vP, wN
18	..	30·282	59·8	40·7	19·1	48·5	+ 7·1	45·1	41·4	7·1	14·8	0·9	77	102·8	34·8	6·1	12·0	0·000	5·8	sP
19	..	30·017	57·8	40·2	17·6	48·0	+ 6·6	44·7	41·1	6·9	13·9	2·0	77	104·2	35·5	7·4	12·0	0·000	2·2	vP
20	..	29·693	53·3	39·0	14·3	45·8	+ 4·3	43·6	41·1	4·7	8·8	0·9	84	92·0	34·0	0·3	12·1	0·017	0·0	sP : vP, wN
21	..	29·541	46·1	32·7	13·4	39·8	− 1·8	37·5	34·5	5·3	14·5	0·0	82	76·6	29·0	1·0	12·2	0·060	0·0	vP, wN
22	Greatest Declination S.	29·760	45·1	30·5	14·6	35·4	− 6·3	33·7	31·1	4·3	11·4	0·0	84	79·0	26·3	2·4	12·2	0·056	0·0	ssP, ssN : vP
23	Last Qr.	29·610	48·3	28·7	19·6	39·7	− 2·1	37·1	33·7	6·0	14·7	0·0	79	77·3	25·2	0·8	12·3	0·116	1·8	sP : vP, vN
24	..	29·169	48·9	39·7	9·2	45·7	+ 3·7	42·5	38·8	6·9	14·9	0·2	77	75·2	34·0	1·6	12·4	0·110	5·2	vP, wN
25	Perigee	29·280	47·3	31·8	15·5	39·2	− 3·1	35·4	30·4	8·8	15·6	1·6	71	96·0	27·3	5·9	12·4	0·018	4·0	vP, wN
26	..	29·592	43·3	29·0	14·3	34·8	− 7·8	32·5	28·8	6·0	14·0	0·0	78	79·0	24·0	2·0	12·5	0·000	0·0	sP, sN
27	..	29·764	46·1	24·6	21·5	35·2	− 7·8	32·5	28·3	6·9	16·3	0·0	75	100·2	20·1	7·2	12·6	0·000	0·0	mP
28	In Equator	29·70[illegible]	48·8	27·5	21·3	37·5	− 5·9	34·5	30·4	7·1	13·7	1·4	76	108·3	21·6	9·5	12·6	0·000	0·0	sP
29	New	29·611	54·8	28·1	26·7	39·7	− 4·1	36·1	31·4	8·3	19·6	0·0	73	96·3	24·0	8·1	12·7	0·000	0·0	vP, wN
30	..	29·842	46·8	26·0	20·8	35·9	− 8·4	32·1	26·4	9·5	16·1	3·1	68	112·0	22·7	7·2	12·8	0·000	3·0	sP : vP
31	..	29·814	46·3	32·7	13·6	38·5	− 6·3	34·8	29·8	8·7	16·5	2·2	71	103·0	28·1	8·7	12·8	0·000	3·0	sP : mP
Means	..	29·725	51·1	35·5	15·6	42·6	+ 1·0	40·2	37·1	5·5	12·2	0·8	81·1	89·5	31·0	3·7	11·8	Sum 1·835	3·1	....
Number of Column for Reference	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers. The result on March 27 for Evaporation Temperature depends partly on values inferred from eye-observations, on account of accidental loss of photographic register.

The values given in Columns 3, 4, 5, 14, and 15 are derived from eye-readings of self-registering thermometers.

The mean reading of the *Barometer* for the month was 29in·725, being 0in·003 *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 59°·8 on March 16 and 18; the lowest in the month was 24°·6 on March 27; and the range was 35°·2.
The mean of all the highest daily readings in the month was 51°·1, being 1°·2 *higher* than the average for the 40 years, 1841–1880.
The mean of all the lowest daily readings in the month was 35°·5, being 0°·2 *higher* than the average for the 40 years, 1841–1880.
The mean daily range was 15°·6, being 1°·0 *greater* than the average for the 40 years, 1841–1880.
The mean for the month was 42°·6, being 1°·0 *higher* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1881.	Wind as deduced from Self-registering Anemometers. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	Clouds and Weather. A.M.	P.M.
			lbs.	lbs.	lbs.	miles.		
Mar. 1	NW : W : WSW	NW : WSW	1·0	0·0	0·1	251	0, ho.-fr : 0	v, cu.-s, slt.-sn : 0
2	WSW	N : ESE	0·0	0·0	0·0	219	0, m : 9	7, cu.-s, ci.-cu, h : 10
3	SE	ESE : E	10·0	0·0	1·6	404	10 : 10	10 : 10
4	ESE : E	E : ESE : SSW	2·8	0·0	0·3	254	10, r : 10, r	10, r : 10, fq.-r
5	S : SE : SW	SW : SSW : SSE	7·5	0·0	0·3	298	10 : 10, hy.-r : 10, oc.-sh	10, slt.-r : 10, hy.-r
6	SW	SW : SSW	7·2	0·0	0·8	417	10 : 4, ci.-cu, ci	5, ci.-cu, ci : 10, oc.-th.-r
7	SSW : SW	SSW : SW : WSW	20·3	0·0	3·2	658	p.-cl : 6, cu.-s, ci.-cu, w	7, ci, ci.-cu, cu.-s, oc.-shs, st.-w : 9, oc.-shs, w
8	SW : WSW : W	WSW	15·0	0·0	1·6	561	10 : 10, sh.-r	9, cu.-s, th.-cl, so.-ha, shs.-r, ltl : 1, th.-cl, lu.-ha, lu.-co m
9	SW : WSW	WSW	15·0	0·0	3·1	735	m, li.-shs : 10, li.-shs, w	10, w : 10, w
10	WSW : W	WSW	6·8	0·0	0·8	482	10 : 10	9, cu.-s, ci.-cu : 10
11	WSW	WSW	1·7	0·0	0·1	331	10 : 10	1, ci, ci.-cu : 2, lu.-ha
12	SW : WSW	E	1·3	0·0	0·0	179	li.-cl : 10, f	9, cu.-s, f : 10
13	E : ESE	E	1·8	0·0	0·1	295	10 : 10	p.-cl : 1, h, lu.-ha
14	ESE : E	E : ENE : NE	0·0	0·0	0·0	195	10 : 5, ci.-cu, th.-cl	5, th.-cl, ci, ci.-cu : 3, ci.-cu
15	NNE : NE	ENE : E	0·0	0·0	0·0	179	0 : 8, ci.-cu, ci	1, th.-cl, so.-ha : 1, th.-cl, lu.-ha
16	Calm : ENE	ENE : Calm	0·0	0·0	0·0	86	0 : 0, slt.-f	0, h : 0
17	Calm	W : SW	0·0	0·0	0·0	117	0 : 0, f	0, f : 0, f
18	SW : WSW	SW : WSW	3·6	0·0	0·3	397	li.-cl : 7, ci, th.-cl	6, ci, ci.-s, ci.-cu : 3, cu.-s
19	WSW	WSW	5·7	0·0	0·6	436	10 : 8, cu.-s	1, th.-cl : 1, li.-cl
20	WSW	WSW : W : NNW	1·7	0·0	0·1	291	li.-cl : 10	9 : 10, oc.-r : 10
21	WSW : NNW	NW : WSW : W	4·8	0·0	0·2	284	10 : 9, ci, cu.-s	9, cu, slt.-r, sn, glm : sn, r, glm : 0
22	NW : WNW : SW	W : N : SSW	5·2	0·0	0·6	374	p.-cl : 10, sn	8, ci.-cu, cu.-s, slt.-sn : 0, hy.-d
23	SW : SSW	S : SSW	7·0	0·0	0·8	383	0, d : 6, ci, th.-cl, so.-ha	10, cu.-s, ci.-cu : 10, sc, r
24	SW : NNW : WNW	WNW : WSW	4·4	0·0	0·4	409	10, c.-r : 10 : 10	9, cu.-s, ci.-cu : v
25	WSW : WNW	W : WSW	8·8	0·0	2·3	590	li.-cl : v, ci.-cu, cu.-s, sn, w	9, cu.-s, ci.-cu, w : v : 0
26	SW : WNW	NE	0·8	0·0	0·0	179	0, ho.-fr : 2, th.-cl, h	5, cu, ci.-cu, th.-cl, h, m, sn : 1, ho.-fr
27	NE	E : ENE	1·0	0·0	0·0	169	0, ho.-fr : 0, ho.-fr	0 : 0
28	NE : ENE	E : ESE : ENE	1·3	0·0	0·0	212	0 : 7, ci.-cu, ci	5, ci.-cu, ci : p.-cl
29	NNE : N	N : NE	5·0	0·0	0·5	260	p.-cl, f : 0, tk.-f	1, th.-cl, h : 10
30	NNE : NE	ENE	5·1	0·0	0·4	329	v : 6, cu, cu.-s, ci.-cu	7, cu, cu.-s, ci.-cu : 4, cu.-s
31	ENE : E	ENE	7·8	0·0	1·6	439	p.-cl : 6, cu, ci.-cu	0 : 0
Means	...	...	..	..	0·6	336		
Number of Column for Reference	21	22	23	24	25	26	27	28

The mean *Temperature of Evaporation* for the month was 40°·2, being 1°·2 *higher* than
The mean *Temperature of the Dew Point* for the month was 37°·1, being 1°·1 *higher* than
The mean *Degree of Humidity* for the month was 81·1, being 0·2 *greater* than
The mean *Elastic Force of Vapour* for the month was 0in·221, being 0in·009 *greater* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 2grs·6, being 0gr·1 *greater* than
The mean *Weight of a Cubic Foot of Air* for the month was 548 grains, being 2 grains *less* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 5·9.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·31. The maximum daily amount of *Sunshine* was 9·5 hours on March 28.

The highest reading of the *Solar Radiation Thermometer* was 112°·0 on March 30; and the lowest reading of the *Terrestrial Radiation Thermometer* was 20°·1 on March 27.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 2·2; for the 6 hours ending 3 p.m., 0·5; and for the 6 hours ending 9 p.m., 0·4.

The *Proportions of Wind* referred to the cardinal points were N. 4, E. 8, S. 7, and W. 11. One day was calm.

The *Greatest Pressure of the Wind* in the month was 20lbs·3 on the square foot on March 7. The mean daily *Horizontal Movement of the Air* for the month was 336 miles; the greatest daily value was 735 miles on March 9; and the least daily value 86 miles on March 16.

Rain fell on 11 days in the month, amounting to 1in·835, as measured by gauge No. 6 partly sunk below the ground; being 0in·388 *greater* than the average fall for the 40 years, 1841–1880.

MONTH and DAY, 1881.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Lowest.	Daily Range.	Mean of 24 Hourly Values.	Excess of Mean above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Greatest of 24 Hourly Values.	Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	hours.	hours.	in.		
Apr. 1	..	29·618	51·3	31·6	19·7	41·7	− 3·6	38·3	34·1	7·6	16·2	0·0	76	106·5	26·5	7·9	12·9	0·002	0·0	wP
2	..	29·667	50·0	36·4	13·6	41·4	− 4·3	37·8	33·3	8·1	17·0	2·1	74	106·8	32·9	7·1	13·0	0·000	0·0	wP : wN : mP
3	..	29·841	44·0	32·8	11·2	37·4	− 8·7	33·2	27·3	10·1	17·2	5·6	67	102·7	27·5	9·5	13·0	0·000	2·0	mP
4	Greatest Declination N	29·826	48·1	29·3	18·8	38·6	− 7·8	34·9	30·0	8·6	16·9	2·5	71	105·6	24·3	11·0	13·1	0·000	6·0	mP
5	..	29·630	48·8	31·8	17·0	39·5	− 7·1	35·9	31·2	8·3	16·6	2·2	73	109·0	27·0	4·4	13·2	0·000	0·0	mP : sP
6	First Qr.	29·642	50·1	32·4	17·7	40·5	− 6·2	36·8	32·1	8·4	19·1	3·1	72	119·9	27·5	4·9	13·2	0·000	6·0	mP
7	Apogee	29·846	49·4	32·2	17·2	40·3	− 6·5	36·7	32·1	8·2	15·7	1·6	72	107·3	27·1	9·8	13·3	0·000	0·0	mP : sP
8	..	29·896	51·0	31·4	19·6	41·5	− 5·3	38·3	34·3	7·2	15·3	1·7	77	116·2	26·9	5·6	13·4	0·000	1·0	mP
9	..	29·890	56·0	35·0	21·0	44·4	− 2·5	41·5	38·1	6·3	14·0	1·1	78	115·3	27·5	3·9	13·4	0·000	6·0	mP
10	..	29·826	59·5	34·8	24·7	45·0	− 1·9	42·4	39·4	5·6	14·1	0·0	81	120·5	26·4	7·0	13·5	0·000	0·0	mP
11	In Equator	29·678	61·3	38·6	22·7	49·7	+ 2·7	47·4	44·9	4·8	11·4	0·0	85	114·3	34·0	1·6	13·6	0·000	1·5	mP : —
12	..	29·733	60·0	45·7	14·3	51·4	+ 4·3	50·0	48·6	2·8	6·8	0·4	90	96·9	40·1	0·1	13·6	0·138	4·5	— : mP
13	..	29·724	66·1	46·9	19·2	53·9	+ 6·7	50·2	46·6	7·3	18·7	0·8	76	121·3	43·1	3·1	13·7	0·000	5·0	mP
14	Full	29·655	62·0	45·6	16·4	52·1	+ 4·7	50·0	47·9	4·2	10·1	0·8	85	109·3	41·2	0·4	13·7	0·012	1·5	vP : mP
15	..	29·742	64·2	43·0	21·2	51·3	+ 3·8	48·2	45·0	6·3	14·8	1·3	79	120·4	38·0	3·4	13·8	0·000	4·5	wP : wP, wN
16	..	29·815	58·9	38·1	20·8	48·4	+ 0·8	46·1	43·6	4·8	11·6	0·0	84	101·8	32·0	1·4	13·9	0·000	3·0	vP : mP
17	..	29·825	66·0	38·0	28·0	52·4	+ 4·6	47·9	43·3	9·1	19·1	0·0	71	120·3	33·0	11·0	13·9	0·000	1·2	wP : mP
18	Greatest Declination S	29·791	64·2	38·9	25·3	51·1	+ 3·2	44·9	38·5	12·6	22·3	3·4	62	121·1	35·9	10·4	14·0	0·000	5·5	mP : vP, vN
19	Perigee	29·801	42·3	37·5	4·8	40·2	− 7·8	36·3	31·3	8·9	12·0	3·9	70	62·3	36·0	0·0	14·1	0·000	5·8	wP, wN : vP
20	..	29·688	44·4	32·2	12·2	38·1	−10·0	35·6	32·2	5·9	10·6	0·8	79	79·0	29·0	0·2	14·1	0·020	1·5	sP : vP, wN
21	Last Qr.	29·602	49·1	30·0	19·1	38·2	−10·0	35·8	32·6	5·6	12·1	0·0	80	106·1	26·3	1·9	14·2	0·000	0·0	ssP : mP : wP, wN
22	..	29·647	51·9	33·0	18·9	41·1	− 7·1	37·6	33·2	7·9	17·8	2·4	74	80·3	29·6	0·9	14·2	0·002	0·0	mP, wN : vP, wN
23	..	29·842	55·8	34·1	21·7	44·9	− 3·4	41·3	37·1	7·8	14·4	2·4	74	102·7	26·2	4·3	14·3	0·087	4·0	sP : wP, vN : vN, vP
24	In Equator	29·825	57·6	42·0	15·6	48·7	+ 0·4	44·9	40·8	7·9	14·8	2·2	74	111·2	39·8	1·8	14·4	0·000	1·0	vP, wN : vP
25	..	29·751	61·5	46·0	15·5	52·1	+ 3·7	48·2	44·2	7·9	14·2	4·4	75	91·1	41·9	0·1	14·4	0·038	3·0	wP : vP, vN
26	..	29·797	55·7	39·7	16·0	47·3	− 1·1	43·5	39·3	8·0	16·6	2·2	75	100·3	34·9	3·4	14·5	0·121	0·0	sP : ssN, sP : wN, vP
27	..	29·959	55·1	38·7	16·4	47·1	− 1·3	43·2	38·8	8·3	13·0	3·0	74	80·6	33·5	0·4	14·5	0·000	0·0	vP, wN
28	New	30·059	59·1	38·1	21·0	48·3	− 0·2	44·7	40·8	7·5	14·1	1·1	75	116·6	30·7	6·4	14·6	0·000	3·2	mP : wP, wN
29	..	29·660	60·1	44·7	15·4	52·0	+ 3·5	49·7	47·4	4·6	8·6	1·3	84	92·5	40·0	0·0	14·7	0·083	2·8	wP, wN : vP
30	..	29·649	65·0	45·7	19·3	53·9	+ 5·3	50·1	46·4	7·5	18·2	0·2	75	119·6	43·0	4·2	14·7	0·120	12·3	mP : mP, wN
Means	..	29·774	55·6	37·5	18·1	45·8	− 1·7	42·4	38·5	7·3	14·8	1·7	76·1	105·2	32·7	4·2	13·8	Sum 0·623	2·7	..
Number of Column for Reference	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers. The results on April 24 and 25 for the Barometer depend partly on values inferred from eye-observations, on account of accidental loss of photographic register.

The values given in Columns 3, 4, 5, 14, and 15 are derived from eye-readings of self-registering thermometers.

The mean reading of the *Barometer* for the month was 29^{in}·774, being 0^{in}·029 *lower* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 66°·1 on April 13; the lowest in the month was 29°·3 on April 4; and the range was 36°·8.

The mean of all the highest daily readings in the month was 55°·6, being 2°·0 *lower* than the average for the 40 years, 1841–1880.

The mean of all the lowest daily readings in the month was 37°·5, being 1°·7 *lower* than the average for the 40 years, 1841–1880.

The mean daily range was 18°·1, being 0°·3 *less* than the average for the 40 years, 1841–1880.

The mean for the month was 45°·8, being 1°·7 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1881.	WIND AS DEDUCED FROM SELF-REGISTERING ANEMOMETERS. OSLER'S. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	ROBINSON'S. Horizontal Movement of the Air.	CLOUDS AND WEATHER. A.M.	P.M.
			lbs.	lbs.	lbs.	miles.		
April 1	NE	ENE: NE	10·0	0·0	2·1	491	0 : 2, ci, ci.-s	3, ci.-s, ci, ci.-cu, w: 8, cu.-s
2	NE	NE	23·0	0·1	5·2	748	p.-cl : 6, ci, ci.-s, ci.-cu, w	3, ci, ci.-cu, cu, st.-w: 6, st.-w
3	NE: ENE	ENE: NE	29·0	1·0	6·2	740	p.-cl, w : 4, ci, ci.-cu, st.-w	3, ci, ci.-s, g : v
4	NE: ENE	ENE	20·0	0·0	5·2	623	v, w : 1, ci.-s, st.-w	2, ci.-s, ci, ci.-cu, so.-ha, st.-w: 6, th.-cl
5	NE: ENE	ENE: NE	12·0	0·0	2·1	515	p.-cl : 7, ci.-s, so.-ha, w	7, ci.-cu, ci.-s, ci, w: 8, cu.-s, ci.-cu
6	NE: ENE	ENE: NE	9·0	0·0	1·8	497	10 : 7, ci.-cu, cu.-s, w	4, ci, ci.-cu, cu.-s, w: 0
7	NE: ENE	ENE: NE	17·0	0·0	3·3	568	0 : 5, ci.-cu, ci.-s, so.-ha, w	3, ci.-cu, ci, ci.-s, se, st.-w: 0
8	NNE: NE: ENE	ENE	13·5	0·0	1·2	406	li.-cl : 4, ci, ci.-cu, w	6, ci, ci.-cu, cu.-s : 10
9	ENE	ENE: E: NE	3·0	0·0	0·2	260	10 : 7, ci.-cu, ci	5, cu, ci.-cu, ci : 0
10	NNE: NE: E	E: ESE	1·9	0·0	0·0	190	0 : 9, cu, ci.-cu, h	0, h : 0, h, hy.-d
11	E: SE: S	SSW	2·3	0·0	0·2	201	0 : 8, ci.-cu, ci.-s, slt.-r	10, slt.-r : 10
12	SSW: S	SSW: SSE: SE	1·2	0·0	0·1	240	10, r : 10, c.-r	9, cu.-s, ci.-cu : 6, ci.-s, ci, lu.-ha
13	ESE	E: ENE	7·7	0·0	0·7	244	ci.-s : 7, ci, ci.-cu	6, ci.-s, ci, ci.-cu, cu.-s: 7, ci.-s, th.-cl, s
14	ENE: E: SSE	SSW	0·0	0·0	0·0	172	p.-cl, ci.-s, s : 10, m.-r	10, slt.-r : 8
15	SW	Variable	0·0	0·0	0·0	181	10 : 9	7, cu.-s, ci.-cu, h : 10, m
16	S: NE: E	E	0·2	0·0	0·0	159	10, m : 10, cu.-s	9, cu.-s, ci.-cu : 0, hy.-d
17	ENE: NE	E: ENE	1·8	0·0	0·2	242	0 : 2, ci, ci.-s	3, cu : 0
18	ENE: NE	NE: NNE	12·0	0·0	1·9	517	th.-cl, m : 8, ci, ci.-s, ci.-cu	1, ci, ci.-cu, w : 6, d
19	NNE	NNE	10·7	0·0	3·1	639	10, w : 10, w	10, w : 10
20	N	N: NNW	4·0	0·0	0·6	300	10 : 10, oc.-sn	9, ci.-cu, cu.-s: 10, oc.-sn : 0
21	NNW	NNW: N: NE	3·2	0·0	0·2	230	0 : 9, ci.-s	7, ci.-cu, cu.-s, ci, r, sn: 10, oc.-r
22	WSW: N	N	2·2	0·0	0·3	217	10 : 10, glm	10, slt.-r : v, m
23	NNW	NW: SW: W	3·3	0·0	0·1	231	10 : 5, ci.-cu, ci.-s, h	9, ci.-cu, cu.-s, h : 10, fq.-r
24	NW: NNW	NNW: WNW: SW	1·7	0·0	0·1	264	p.-cl : 10	9, ci.-cu, ci : v, m
25	SW	WSW: WNW	4·3	0·0	1·4	462	10 : 10, oc.-slt.-r	10, shs.-r, t : 10
26	WSW: WNW	NW: NNW	7·0	0·0	0·4	348	p.-cl : 10, li.-shs	7, cu.-s, cu, shs.-r, sl, hl, l, t : 0
27	W: WSW: NW	NW: SE: Calm	1·0	0·0	0·0	178	v : 10, ci.-cu, cu.-s	10, slt.-f : v
28	Calm and Variable	S: SSW	0·8	0·0	0·0	153	v : 0	8, ci.-cu, ci, cu.-s, glm: v
29	SSW: SW	SW	2·4	0·0	0·2	315	10 : 10	9, cu.-s, ci.-cu : 10, r
30	SW: SSW	S: SW	4·4	0·0	0·7	375	10, slt.-r : 5, cu, cu.-s, ci.-s	8, cu, ci.-s, th.-cl, so.-ha: v, shs.-r
Means	...	...	..	..	1·2	357		
Number of Column for Reference.	21	22	23	24	25	26	27	28

The mean *Temperature of Evaporation* for the month was 42°·4, being 1°·5 *lower* than
The mean *Temperature of the Dew Point* for the month was 38°·5, being 1°·8 *lower* than
The mean *Degree of Humidity* for the month was 76·1, being 0·8 *less* than
The mean *Elastic Force of Vapour* for the month was 0in·233, being 0in·017 *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 2grs·7, being 0gr·2 *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 546 grains, being 2 grains *greater* than
} the average for the 20 years, 1849-1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 6·7.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·30. The maximum daily amount of *Sunshine* was 11·0 hours on April 4 and 17.

The highest reading of the *Solar Radiation Thermometer* was 121°·3 on April 13; and the lowest reading of the *Terrestrial Radiation Thermometer* was 24°·3 on April 4.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 1·6; for the 6 hours ending 3 p.m., 0·6; and for the 6 hours ending 9 p.m., 0·5.

The *Proportions of Wind* referred to the cardinal points were N. 9, E. 11, S. 5, and W. 4. One day was calm.

The *Greatest Pressure of the Wind* in the month was 29lbs·0 on the square foot on April 3. The mean daily *Horizontal Movement of the Air* for the month was 357 miles; the greatest daily value was 748 miles on April 2; and the least daily value 153 miles on April 28.

Rain fell on 8 days in the month, amounting to 0in·623, as measured by gauge No. 6 partly sunk below the ground; being 1in·052 *less* than the average fall for the 40 years, 1841-1880.

MONTH and DAY, 1881.	Phases of the Moon.	Barometer. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	Temperature. Of the Air. Highest.	Lowest.	Daily Range.	Mean of 24 Hourly Values.	Excess of Mean above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Greatest of 24 Hourly Values.	Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	Temperature. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	hrs.	hrs.	in.		
May 1	Greatest Declination N.	29·504	61·9	42·0	19·9	50·2	+ 1·5	47·2	44·0	6·2	14·6	0·4	80	113·8	38·5	5·2	14·8	0·152	9·0	mP : mP : sP, sN
2	..	29·486	59·3	44·3	15·0	50·2	+ 1·3	48·2	46·1	4·1	11·0	0·0	86	104·0	41·1	0·1	14·8	0·231	3·7	sP, sN : mP : vN, vP
3	..	29·802	50·4	36·3	14·1	44·3	− 4·8	41·2	37·6	6·7	11·8	0·7	77	109·0	32·0	2·0	14·9	0·000	0·0	mP : vP
4	Apogee	29·888	55·1	31·4	23·7	46·0	− 3·4	44·1	41·9	4·1	9·6	0·0	87	110·3	26·5	3·1	14·9	0·029	5·0	vP : vP, sN
5	..	30·016	66·9	40·2	26·7	51·9	+ 2·2	48·2	44·5	7·4	17·1	0·0	76	122·2	35·2	4·5	15·0	0·000	2·3	ssP : wP, wN : mP
6	First Qr.	30·127	69·4	49·8	19·6	57·7	+ 7·7	54·5	51·6	6·1	13·3	0·8	80	127·8	46·1	7·4	15·1	0·000	8·7	mP : vP
7	..	30·380	69·2	43·6	25·6	56·4	+ 6·1	50·3	44·7	11·7	20·5	1·3	65	112·8	38·7	10·7	15·1	0·000	0·0	sP, wN : wN, vP
8	..	30·454	66·2	41·6	24·6	53·3	+ 2·7	47·6	41·9	11·4	21·4	2·4	66	121·0	32·3	12·8	15·2	0·000	0·0	mP
9	In Equator	30·426	59·3	37·0	22·3	48·4	− 2·4	44·2	39·6	8·8	16·6	0·0	72	124·0	27·5	8·6	15·2	0·000	1·5	vP
10	..	30·440	54·7	37·0	17·7	45·5	− 5·6	41·1	36·1	9·4	15·0	3·3	70	101·0	28·5	4·0	15·3	0·000	7·5	vP
11	..	30·415	59·3	30·9	28·4	45·8	− 5·6	42·0	37·6	8·2	19·2	0·0	73	115·0	21·9	7·4	15·3	0·000	3·0	ssP : vP, wN : sP
12	..	30·231	66·0	36·0	30·0	51·1	− 0·7	46·8	42·3	8·8	16·2	0·0	72	129·2	28·2	6·7	15·4	0·000	0·0	sP : wN, mP : mP
13	Full	29·999	73·8	40·7	33·1	56·2	+ 4·1	49·9	44·0	12·2	22·1	2·4	64	121·9	33·0	11·1	15·4	0·000	5·5	vP, wN
14	..	29·823	69·7	41·8	27·9	55·7	+ 3·2	50·2	45·0	10·7	16·7	2·2	67	123·6	35·8	3·9	15·5	0·000	7·7	vP, wN
15	Greatest Declination S.	29·575	64·2	47·2	17·0	53·9	+ 1·0	50·0	46·2	7·7	18·6	0·2	75	115·1	44·2	0·8	15·5	0·007	12·3	mP : vN, mP
16	Perigee	29·451	58·2	42·6	15·6	50·7	− 2·6	47·1	43·3	7·4	14·1	2·6	76	93·8	37·0	2·4	15·6	0·069	4·5	wP, wN : vN, vP
17	..	29·749	61·4	36·8	24·6	49·9	− 3·8	47·3	44·5	5·4	16·3	0·2	83	118·3	28·2	2·2	15·6	0·068	9·5	sP : wP, wN : mP
18	..	29·465	67·4	49·4	18·0	54·1	0·0	52·8	51·5	2·6	10·6	0·0	91	115·5	47·9	1·8	15·7	0·217	17·8	wP, wN : vP, wN
19	..	29·488	63·7	47·8	15·9	53·9	− 0·5	50·4	47·0	6·9	13·9	0·0	77	118·0	44·0	10·8	15·7	0·056	8·2	mP, wN : vP, wN
20	Last Qr.	29·752	66·6	45·5	21·1	53·1	− 1·6	49·3	45·5	7·6	18·2	1·9	75	129·5	40·5	10·0	15·8	0·100	11·2	vP : vP, vN
21	In Equator	30·122	70·1	40·6	29·5	54·6	− 0·4	49·8	45·2	9·4	20·0	0·7	70	129·9	35·9	10·3	15·8	0·000	7·3	mP : vP, wN
22	..	30·236	69·9	42·7	27·2	56·6	+ 1·3	51·1	46·0	10·6	22·3	0·8	67	138·0	33·1	13·9	15·9	0·000	4·8	mP : vP, wN
23	..	30·076	71·1	47·5	23·6	59·5	+ 4·0	53·0	47·3	12·2	24·3	0·4	64	135·7	38·3	13·6	15·9	0·000	14·2	mP : vN, mP
24	..	29·892	68·0	48·4	19·6	57·9	+ 2·2	52·1	46·9	11·0	20·7	3·2	67	135·3	37·3	12·7	16·0	0·000	12·5	mP
25	..	29·666	73·7	49·3	24·4	58·7	+ 2·8	55·1	51·9	6·8	22·1	0·0	78	134·7	43·0	5·2	16·0	0·050	5·5	mP : vP, mN
26	..	29·623	68·7	50·9	17·8	59·5	+ 3·4	57·6	55·9	3·6	8·3	0·0	89	108·0	43·0	1·3	16·0	0·074	0·0	sP, sN : wP, wN
27	New	29·662	66·1	56·1	10·0	60·8	+ 4·5	58·7	56·9	3·9	7·0	1·7	87	83·9	55·3	0·0	16·1	0·000	0·0	wP, wN
28	Greatest Declination N.	29·748	71·8	55·8	16·0	61·5	+ 5·0	58·8	56·5	5·0	12·6	0·0	84	121·7	53·1	3·2	16·1	0·271	0·0	vP, vN
29	..	29·873	66·5	49·3	17·2	56·2	− 0·6	54·7	53·3	2·9	7·6	0·0	90	113·3	43·0	0·1	16·1	0·287	0·0	vP, ssN : vP, wN
30	..	30·103	72·6	44·6	28·0	59·0	+ 2·0	53·0	47·7	11·3	23·8	0·0	66	130·2	37·8	12·9	16·2	0·000	0·0	mP
31	..	30·165	78·3	44·6	33·7	62·9	+ 5·6	54·3	46·9	16·0	28·2	3·8	56	134·2	39·0	13·5	16·2	0·000	0·0	sP : vP
Means	..	29·925	65·8	43·6	22·2	54·0	+ 0·9	50·0	46·1	7·9	16·6	0·9	75·2	119·1	37·6	6·5	15·6	Sum 1·611	5·2	..
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, and 15 are derived from eye-readings of self-registering thermometers.

The mean reading of the *Barometer* for the month was 29in·925, being 0in·148 *higher* than the average for the 20 years, 1854–1873.

Temperature of the Air.

The highest in the month was 78°·3 on May 31; the lowest in the month was 30°·9 on May 11; and the range was 47°·4.
The mean of all the highest daily readings in the month was 65°·8, being 1°·6 *higher* than the average for the 40 years, 1841–1880.
The mean of all the lowest daily readings in the month was 43°·6, being 0°·1 *lower* than the average for the 40 years, 1841–1880.
The mean daily range was 22°·2, being 1°·8 *greater* than the average for the 40 years, 1841–1880.
The mean for the month was 54°·0, being 0°·9 *higher* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1881.	Wind as deduced from Self-registering Anemometers. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	Clouds and Weather. A.M.	P.M.
			lbs.	lbs.	lbs.	miles.		
May 1	SW	SSW	5·7	0·0	0·7	382	0 : 10, shs.-r	10 : 10, r
2	Calm: NE: ENE	E: ENE: NNE	2·1	0·0	0·1	205	10, sh.-r : 9, s	9, ci, ci.-cu, cu.-s, h, oc.-r: 10, r
3	NNE: N	N: NNE	3·7	0·0	0·4	285	10 : 6, cu, ci.-cu, cu.-s	9, cu, cu.-s : 8
4	Calm: S: SSW	SSW: WSW	3·1	0·0	0·2	299	p.-cl : 7, ci, cu.-s, ci.-cu, li.-shs	10, li.-shs : v, l
5	WSW: SW	SW	3·7	0·0	0·3	302	0 : p.-ci, m, d : 7, ci.-cu, ci	8, cu, cu.-s, ci.-cu, so.-ha: v, th.-cl, lu.-ha
6	SW	SW: WSW	4·6	0·0	0·8	399	10 : 8, ci.-cu, cu.-s	2, cu, cu.-s, ci.-cu : p.-cl, d
7	WSW: N: NW	NNW: N: NE	0·0	0·0	0·0	174	0, m : 1, th.-cl, h	0 : 0, lu.-co
8	NE: NNE	N: E	1·8	0·0	0·1	207	0 : 1, cu	0 : 0
9	NNE: N	N: NNE	5·0	0·0	0·8	344	p.-cl, s, ci.-s : v, ci.-cu, ci.-s	4, ci.-cu, cu.-s : 8, ci.-cu, cu.-s
10	NNE: NE	NE: ENE	3·3	0·0	0·4	349	10 : 9, ci.-cu, cu.-s	9, cu, cu.-s : 0
11	NNE: N	NNE: ESE: SE	0·1	0·0	0·0	157	0 : 1, ci.-s, ci.-cu, h, so.-ha	3, ci, ci.-s, h, so.-ha : 0
12	NE	ESE: SE	0·0	0·0	0·0	124	0 : 4, ci, h, so.-ha	6, ci.-cu, ci, cu : 0
13	SW	SW	1·2	0·0	0·0	233	0, m : 1, ci	0 : 0
14	SW: WSW	WSW: SW	1·6	0·0	0·0	282	li.-cl : 10, th.-cl, so.-ha	9, ci, ci.-s, th.-cl : 10
15	SW: SSW	SSW	10·0	0·0	1·9	459	10 : 10, th.-cl, so.-ha	10, w : v, ci.-s, sh.-r
16	SW: WSW	WSW: WNW: NNW	9·6	0·0	2·6	545	10, li.-shs : 10, li.-shs, sqs	9, cu.-s, cu, li.-shs, w : v, cu.-s, m
17	WSW: S: SSW	SSW: SW	10·0	0·0	2·3	464	p.-cl : 8, ci, ci.-cu	10, li.-shs, w : 10, m.-r, w
18	SSW	SSW	9·5	0·0	2·0	497	10, w : 10, r	8, ci.-cu, ci.-s, cu.-s: 9, cu.-s, r : 10
19	SSW: SW	SW	9·1	0·0	2·4	501	10, r : 4, cu	6, cu, cu.-s, ci, so.-ha, w : 0
20	SW: WSW	SW	6·0	0·0	0·9	368	0 : 6, ci.-cu, cu.-s	8, cu.-s, cu, hy.-sh, hl : 0
21	SW: WSW	WSW: SSW	0·0	0·0	0·0	180	0 : 3, th.-cl, cu	5, ci.-cu, ci, cu.-s : 3, ci.-s, cu.-s
22	SSW: ESE: ENE	E: ENE	6·0	0·0	0·6	292	0, slt.-m : 0	0 : 0
23	ENE: E	E: ENE	16·0	0·0	1·6	386	0 : 0	0, w : 0
24	ENE: E	E: ENE	6·1	0·0	0·9	315	0 : 0	1, ci : p.-cl, cu.-s
25	ENE	ESE	0·3	0·0	0·0	59	10 : 3, ci.-cu, ci	9, ci.-s, cu, so.-ha, hy.-sh : 2, m, tk.-f
26	Calm: NW	NW: W	0·0	0·0	0·0	99	p.-cl, f : 10, r	9, cu.-s, hy.-sh : 10
27	NNW: NW	NNW: NW: WNW	0·0	0·0	0·0	161	10 : 10	10 : 10, li.-shs : 10
28	WSW: NNW	NNE: SE	1·2	0·0	0·0	172	10 : 4, th.-cl, ci, ci.-cu, hy.-sh	8, cu.-s, ci, th.-cl : hy.-r, l, t : 10
29	N: ENE	E: NE	3·0	0·0	0·0	228	10, slt.-r : 10, hy.-r : 10, slt.-r	9, cu.-s, ci.-cu, fq.-th.-r: hy.-sh : v
30	NE: E	ENE: E	3·4	0·0	0·1	255	0 : 0	0 : 0
31	NE	NNE: SE	1·0	0·0	0·0	154	0 : 0	1, th.-cl, ci.-cu : 0
Means	...	...	..	..	0·6	286		
Number of Column for Reference.	21	22	23	24	25	26	27	28

The mean *Temperature of Evaporation* for the month was 50°·0, being 1°·1 *higher* than
The mean *Temperature of the Dew Point* for the month was 46°·1, being 1°·0 *higher* than
The mean *Degree of Humidity* for the month was 75·2, being 0·2 *less* than
The mean *Elastic Force of Vapour* for the month was $0^{in}·312$, being $0^{in}·011$ *greater* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was $3^{grs}·5$, being $0^{gr}·1$ *greater* than
The mean *Weight of a Cubic Foot of Air* for the month was 539 grains, being 1 grain *greater* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 5·4.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·42. The maximum daily amount of *Sunshine* was 13·9 hours on May 22.

The highest reading of the *Solar Radiation Thermometer* was 138°·0 on May 22; and the lowest reading of the *Terrestrial Radiation Thermometer* was 21°·9 on May 11.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 3·0; for the 6 hours ending 3 p.m., 1·5; and for the 6 hours ending 9 p.m., 0·7.

The *Proportions of Wind* referred to the cardinal points were N. 8, E. 7, S. 8, and W. 7. One day was calm.

The *Greatest Pressure of the Wind* in the month was $16^{lbs}·0$ on the square foot on May 23. The mean daily *Horizontal Movement of the Air* for the month was 286 miles; the greatest daily value was 545 miles on May 16; and the least daily value 59 miles on May 25.

Rain fell on 13 days in the month, amounting to $1^{in}·611$, as measured by gauge No. 6 partly sunk below the ground; being $0^{in}·418$ *less* than the average fall for the 40 years, 1841–1880.

MONTH and DAY, 1881.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Of the Air. Lowest.	Of the Air. Daily Range.	Of the Air. Mean of 24 Hourly Values.	Of the Air. Excess of Mean above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value	Greatest of 24 Hourly Values.	Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	hours.	hours.	in.		
June 1	Apogee	30·048	81·1	47·9	33·2	63·4	+ 5·9	55·7	49·2	14·2	30·1	1·4	60	135·9	42·0	11·9	16·2	0·000	0·0	vP : vP, wN
2	..	29·982	77·1	49·6	27·5	63·2	+ 5·5	58·2	54·0	9·2	17·8	0·0	72	139·2	41·3	12·6	16·3	0·000	0·0	vP : sP
3	..	29·957	80·0	50·9	29·1	65·5	+ 7·0	58·0	51·9	13·6	27·2	0·2	61	125·8	45·6	11·3	16·3	0·000	0·0	vP, wN : vN, vP
4	..	29·810	83·9	54·0	29·9	66·9	+ 8·8	57·7	50·3	16·6	32·5	2·7	55	140·0	47·5	13·0	16·3	0·000	1·5	vP : mP
5	First Quarter In Equator	29·436	63·5	52·9	10·6	56·3	− 1·9	54·9	53·6	2·7	8·9	0·0	91	87·8	49·0	0·0	16·4	0·451	12·2	wP : vN, vP
6	..	29·299	62·6	45·2	17·4	50·8	− 7·5	48·9	46·9	3·9	13·3	0·0	85	111·2	44·0	1·6	16·4	0·470	7·0	vP, ssN
7	..	29·454	54·0	43·1	10·9	48·4	−10·0	46·4	44·2	4·2	11·0	0·0	86	92·1	38·0	0·1	16·4	0·162	0·0	wP, wN : wP, sN :—
8	..	29·751	59·4	41·1	18·3	48·9	− 9·6	44·7	40·2	8·7	17·7	2·0	72	129·0	36·0	10·2	16·4	0·000	3·0	..
9	..	30·016	57·8	38·5	19·3	47·4	−11·1	43·6	39·4	8·0	13·8	2·2	75	119·7	33·1	8·7	16·4	0·000	0·0	..
10	..	29·909	61·4	41·0	20·4	50·7	− 7·9	45·4	39·9	10·8	19·2	2·7	67	118·3	32·8	6·9	16·5	0·000	2·0	..
11	..	29·857	65·4	45·4	20·0	54·6	− 4·1	50·0	45·6	9·0	17·3	1·7	71	131·4	42·6	3·8	16·5	0·000	7·0	..
12	Greatest Dec. S. Full	29·875	71·0	52·4	18·6	59·5	+ 0·7	54·5	50·0	9·5	21·2	1·2	71	129·0	47·6	4·8	16·5	0·000	0·0	..
13	Perigee	29·882	70·1	51·6	18·5	58·7	− 0·2	53·3	48·5	10·2	19·4	1·6	69	116·8	44·6	8·6	16·5	0·000	0·8	—: vN, vP
14	..	29·863	67·4	50·7	16·7	57·8	− 1·3	53·6	49·8	8·0	14·9	0·8	75	133·2	43·5	3·9	16·5	0·000	3·2	wP, wN : wP
15	..	29·805	73·6	47·0	26·6	60·2	+ 0·9	55·0	50·4	9·8	18·0	0·6	70	139·3	38·5	4·4	16·5	0·000	3·0	wP, wN : vP, wN
16	..	29·779	73·3	52·1	21·2	61·8	+ 2·3	57·1	53·1	8·7	18·7	0·2	73	127·0	46·5	2·1	16·5	0·000	9·8	mP : vP
17	..	29·747	72·2	56·9	15·3	62·5	+ 2·8	59·6	57·1	5·4	13·1	0·0	83	116·5	52·1	1·4	16·6	0·490	13·0	vP, wN : vP, vN
18	In Equator Last Quarter	29·690	66·4	56·4	10·0	60·3	+ 0·4	58·8	57·5	2·8	7·9	0·0	91	94·2	54·0	0·0	16·6	0·079	12·0	vP, vN : wP
19	..	29·657	72·5	54·3	18·2	59·7	− 0·5	55·9	52·6	7·1	18·2	0·0	78	135·0	52·5	7·1	16·6	0·000	11·0	mP
20	..	29·606	70·6	53·8	16·8	61·0	+ 0·5	56·1	51·9	9·1	15·7	1·4	72	128·3	49·2	8·1	16·6	0·000	12·2	mP : wP, wN : vP
21	..	29·432	73·4	56·4	17·0	63·0	+ 2·2	58·5	54·7	8·3	16·7	1·7	74	130·5	51·0	4·4	16·6	0·012	16·2	vP, wN
22	..	29·565	70·4	52·7	17·7	60·5	− 0·6	56·1	52·3	8·2	18·7	2·1	74	133·8	48·0	7·5	16·6	0·025	15·5	mP, wN
23	..	29·926	71·7	51·5	20·2	60·7	− 0·7	55·0	50·0	10·7	18·4	1·8	67	137·0	47·1	7·8	16·6	0·000	5·2	mP: wP,wN: vN,vP
24	..	30·047	77·2	48·4	28·8	61·5	− 0·2	55·5	50·4	11·1	21·6	0·4	67	145·2	38·4	10·6	16·6	0·000	1·2	mP : vP
25	Greatest Declination N	29·882	65·9	47·5	18·4	56·5	− 5·4	54·0	51·7	4·8	13·3	0·2	84	115·6	36·9	0·6	16·6	0·155	8·0	sP : vP, vN : sP
26	New	29·977	75·0	48·5	26·5	60·0	− 2·0	55·7	51·9	8·1	17·6	0·0	75	131·1	43·2	7·4	16·5	0·000	4·8	sP : vP
27	..	29·802	64·2	54·0	10·2	57·8	− 4·2	55·3	53·0	4·8	9·5	0·6	84	94·6	49·6	0·0	16·5	0·009	9·0	sP : vP
28	..	29·897	70·1	50·9	19·2	59·4	− 2·5	53·8	48·8	10·6	17·6	1·3	68	132·7	44·7	6·4	16·5	0·000	0·0	sP : vP,wN : wN,sP
29	Apogee	30·062	73·7	50·1	23·6	60·9	− 0·9	54·1	48·2	12·7	22·7	3·2	63	144·5	45·8	10·0	16·5	0·000	0·0	sP : wP,wN : wN,sP
30	..	30·082	76·2	47·2	29·0	60·5	− 1·2	54·5	49·2	11·3	21·2	0·6	66	145·3	38·8	10·5	16·5	0·000	5·3	sP : wP, wN : vP
Means	..	29·806	70·0	49·7	20·3	58·6	− 1·1	54·0	49·9	8·7	17·8	1·0	73·4	125·3	44·1	6·2	16·5	Sum 1·863	5·4	..
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, and 15 are derived from eye-readings of self-registering thermometers.

The amount of Sunshine on June 19 was in part estimated, on account of wrong adjustment of the instrument.

The Electrometer was not in action from June 8 to 12.

The mean reading of the *Barometer* for the month was 29^{in}·806, being 0^{in}·022 *lower* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 83°·9 on June 4; the lowest in the month was 38°·5 on June 9; and the range was 45°·4.

The mean of all the highest daily readings in the month was 70°·0, being 1°·0 *lower* than the average for the 40 years, 1841–1880.

The mean of all the lowest daily readings in the month was 49°·7, being 0°·2 *lower* than the average for the 40 years, 1841–1880.

The mean daily range was 20°·3, being 0°·8 *less* than the average for the 40 years, 1841–1880.

The mean for the month was 58°·6, being 1°·1 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY. 1881.	WIND AS DEDUCED FROM SELF-REGISTERING ANEMOMETERS. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	CLOUDS AND WEATHER. A.M.	P.M.
			lbs.	lbs.	lbs.	miles.		
June 1	Variable	NE : E	0·0	0·0	0·0	96	0 : 10, th.-cl, h, m	1, ci, so.-ha : 0, d
2	E : NE	E : ESE	1·4	0·0	0·0	162	0 : 1, ci.-cu, ci	3, ci.-cu, cu, ci : 3, cu.-s, ci.-s, s
3	Calm : SW : N	N:NNW:Variable	0·0	0·0	0·0	127	0 : 0, h	0, h : v, th.-cl
4	NW : SW	SW	2·8	0·0	0·3	300	0 : 7, th.-cl	4, ci, ci.-s, th.-cl : p.-cl, ci, th.-cl, s, m
5	SW	SSW: SW: NE	4·3	0·0	0·5	366	p.-cl, s, a : 10	10, r : 10, c.-r
6	N : NNW	NNW: W: WSW	5·0	0·0	0·1	244	10, fq.-r : 10, oc.-r	9,cu.-s,ci.-cu,oc.-shs,t : 10, hy.-r, hl, t
7	NNW : N	NE : N	2·9	0·0	0·1	251	10 : 10, r	10, cu.-s, fq.-shs : 7, ci.-cu, li.-cl
8	N : NNE	NNE : N	4·1	0·0	0·3	363	p.-cl : 6, cu, slt.-r, hl	8, cu, ci.-cu, slt.-sh : 1, ci.-s, d
9	NNW : N	NNW : NE	5·0	0·0	0·2	284	p.-cl : 7, ci.-cu, cu, ci.-s	6, cu.-s, cu, ci, slt.-sh : 10
10	NNW	SW : S	0·1	0·0	0·0	158	10 : v, ci.-cu, ci, h	9, cu.-s, ci.-cu, glm : 10
11	SE : SSE	SE : S : SW	0·0	0·0	0·0	102	10 : 7, li.-cl, ci.-cu	8,ci,ci.-cu,cu.-s,th.-cl : 10
12	SW : WSW	WSW : W	2·5	0·0	0·0	233	10 : 7, cu.-s, th.-cl	6, cu.-s, ci.-cu, ci : 8, ci, ci.-cu
13	NNW : NW	N : ENE	0·0	0·0	0·0	178	v, s, ci, li.-cl : 3, ci.-s, th.-cl, h	6, cu, cu.-s, h : 5, cu.-s, s, th.-cl
14	ENE	E : SE : SW	0·0	0·0	0·0	134	10 : 2, cu, li.-cl	7, cu, ci.-cu, cu.-s : 10
15	SW : SSW	SW : SSW	0·0	0·0	0·0	136	10, li.-cl : 8, ci	9, cu.-s, cu : 1, s, ci.-s, d
16	S : SSE	SSE : SE	0·5	0·0	0·0	143	p.-cl, ci.-s, th.-cl : 10, ci.-s	9,cu.-s,cu,ci.-s,slt.-r : 10, slt.-r
17	SSE : SSW	SSW: SSE: ESE	2·1	0·0	0·1	225	10, sh.-r : 10, cu.-s	10,cu.-s,th.-cl,so.-ha : 10, hy.-r
18	SE : SSE	S : SSE	0·5	0·0	0·0	174	10 : 10, r	10, li.-shs : 10, oc.-r
19	SW	SW	2·1	0·0	0·2	293	10 : 9, cu.-s, ci.-cu	4, cu, cu.-s, : 1, cu.-s
20	SW : SSW	SSW : SE	2·1	0·0	0·1	307	p.-cl : 6,cu.-s, th.-cl,so.-ha	6, cu.-s, cu, ci : 10
21	SE : SSW	SSW	6·5	0·0	0·7	395	10 : 8, cu, cu.-s, li.-shs	7, cu.-s, cu : 8,cu.-s,ci.-cu,li.-shs
22	SSW	SW	7·3	0·0	0·7	437	10 : 9, shs.-r	6,cu,ci.-cu,cu.-s,ci : 0
23	SW : WSW	WSW: NW: N	0·5	0·0	0·0	264	0 : 7, cu, cu.-s	8, cu.-s, n, ci.-cu : 5, ci.-s, th.-cl, m
24	Variable	S	0·0	0·0	0·0	117	p.-cl : 3, ci.-cu, cu.-s, h	5, cu, cu.-s : 0
25	Calm:SSW:WSW	SW	0·9	0·0	0·0	249	0 : 9, ci.-s, th.-cl, r	10, fq.-th.-r : 0
26	WSW: NW: WNW	NW: WSW: SW	0·0	0·0	0·0	168	0 : 9, li.-cl, m, h	8, cu.-s, ci.-cu : p.-cl : 10
27	SW : SSW	SSW: SW: WSW	0·3	0·0	0·0	224	10 : 10, r	10, cu.-s, n, oc.-r : 10, oc.-slt.-r
28	NW : NNW	WNW : WSW	0·0	0·0	0·0	242	10 : 0, h : 4, cu.-s, ci.-cu	8, cu.-s, ci.-cu : 9, th.-cl, s
29	WSW	W : WSW	1·0	0·0	0·0	244	10 : v, ci.-cu, h	7, ci.-cu, cu.-s, ci : 1, th.-cl
30	SW : SSW	SSW : S	1·5	0·0	0·1	272	1, s : 6, ci.-cu, ci	5, ci, ci.-s, ci.-cu : 3, ci, s, ci.-s
Means	...	...	..	..	0·1	230		
Number of Column for Reference.	21	22	23	24	25	26	27	28

The mean *Temperature of Evaporation* for the month was 54°·0, being 1°·2 *lower* than
The mean *Temperature of the Dew Point* for the month was 49°·9, being 1°·3 *lower* than
The mean *Degree of Humidity* for the month was 73·4, being 0·1 *greater* than
The mean *Elastic Force of Vapour* for the month was 0in·360, being 0in·017 *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 4grs·0, being 0gr·2 *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 532 grains, being 1 grain *greater* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 6·6.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·38. The maximum daily amount of *Sunshine* was 13·0 hours on June 4.

The highest reading of the *Solar Radiation Thermometer* was 145°·3 on June 30; and the lowest reading of the *Terrestrial Radiation Thermometer* was 32°·8 on June 10.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 2·9; for the 6 hours ending 3 p.m., 1·4; and for the 6 hours ending 9 p.m., 1·1.

The *Proportions of Wind* referred to the cardinal points were N. 6, E. 4, S. 11, and W. 8. One day was calm.

The *Greatest Pressure of the Wind* in the month was 7lbs·3 on the square foot on June 22. The mean daily *Horizontal Movement of the Air* for the month was 230 miles; the greatest daily value was 437 miles on June 22; and the least daily value 96 miles on June 1.

Rain fell on 9 days in the month, amounting to 1in·863, as measured by gauge No. 6 partly sunk below the ground; being 0in·188 *less* than the average fall for the 40 years, 1841–1880.

MONTH and DAY, 1881.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Lowest.	Daily Range.	Mean of 24 Hourly Values.	Excess of Mean above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Greatest of 24 Hourly Values.	Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	hours.	hours.	in.		
July 1	..	29·840	82·6	54·6	28·0	68·3	+ 6·7	58·7	51·2	17·1	33·0	4·9	54	144·6	46·1	9·8	16·5	0·000	11·7	mP: wP, wN: vP, vN
2	In Equator	29·921	77·1	54·7	22·4	65·2	+ 3·7	59·8	55·4	9·8	18·9	0·2	72	133·4	44·4	6·1	16·5	0·000	0·0	vP : vN, mP
3	..	29·974	84·7	55·2	29·5	68·6	+ 7·2	61·8	56·5	12·1	24·3	2·3	65	142·0	50·0	6·4	16·4	0·000	0·0	mP : wP, wN : mP
4	First Qr.	30·036	90·1	62·8	27·3	74·1	+12·7	67·3	62·3	11·8	22·2	2·3	67	148·9	58·1	11·4	16·4	0·000	0·0	mP : vP, wN
5	..	29·906	92·8	61·5	31·3	76·3	+14·8	68·1	62·3	14·0	27·0	0·4	63	156·5	51·6	10·8	16·4	0·090	1·5	mP : vP, sN
6	..	29·639	68·1	52·0	16·1	63·6	+ 1·9	61·4	59·6	4·0	10·3	0·0	87	102·1	45·0	0·6	16·4	0·894	4·5	vN : mP
7	..	29·896	66·1	49·2	16·9	57·3	− 4·6	52·3	47·7	9·6	13·5	3·2	70	113·0	42·1	5·6	16·3	0·000	1·0	mP : wP, wN
8	..	29·822	65·8	51·4	14·4	57·6	− 4·6	54·4	51·5	6·1	10·5	1·6	80	112·2	44·5	0·3	16·3	0·020	8·0	mP : wP : vN, vP
9	Greatest Declination S.	29·827	72·7	47·6	25·1	59·6	− 2·9	55·5	51·9	7·7	16·4	0·0	76	133·4	41·4	6·3	16·3	0·002	1·0	vP : wP, wN : wP
10	..	29·944	74·1	56·0	18·1	63·5	+ 0·8	57·4	52·3	11·2	22·0	2·3	67	123·8	52·0	11·6	16·3	0·000	1·5	mP : wP
11	Full	30·027	79·6	54·2	25·4	67·1	+ 4·2	58·6	51·8	15·3	22·3	5·7	58	141·1	47·8	13·8	16·2	0·000	6·2	vP : —
12	Perigee	29·912	86·2	54·8	31·4	69·9	+ 6·8	62·5	56·8	13·1	22·3	3·0	62	146·6	43·7	10·6	16·2	0·017	5·2	— : vP, vN
13	..	30·060	81·4	52·9	28·5	66·7	+ 3·4	61·0	56·4	10·3	17·5	2·6	70	143·4	47·2	13·0	16·2	0·000	3·0	mP: vP, wN: wN, mP
14	..	30·107	89·1	57·1	32·0	71·2	+ 7·8	65·7	61·5	9·7	21·6	0·4	71	144·8	52·3	9·7	16·1	0·000	4·0	vP
15	In Equator	29·908	97·1	60·2	36·9	78·4	+15·0	68·7	62·0	16·4	31·7	2·3	57	153·7	49·9	11·1	16·1	0·000	0·0	vP : vP, vN
16	..	29·884	84·3	61·8	22·5	71·3	+ 7·8	64·3	59·0	12·3	21·3	3·8	65	151·7	53·4	7·4	16·1	0·023	2·0	vP, ssN : vP, wN
17	..	29·898	85·2	61·0	24·2	71·1	+ 7·6	63·2	57·2	13·9	27·5	3·4	62	133·4	55·1	8·4	16·0	0·000	1·2	vP
18	Last Qr.	29·821	90·2	59·0	31·2	74·2	+10·8	63·6	55·9	18·3	27·2	8·6	53	146·8	50·3	13·4	16·0	0·000	3·8	sP : vP : vP, wN
19	..	29·701	88·0	60·1	27·9	74·2	+10·9	65·8	59·7	14·5	23·8	4·0	61	136·2	52·5	7·6	16·0	0·000	0·0	sP : vN, vP
20	..	29·690	76·0	57·3	18·7	66·0	+ 2·8	59·6	54·4	11·6	21·4	2·9	66	127·0	53·4	4·1	15·9	0·025	0·0	vP, vN
21	..	29·834	73·4	51·6	21·8	61·4	− 1·6	53·8	47·2	14·2	27·4	4·6	60	139·2	40·0	11·3	15·9	0·000	1·2	sP : vP, wN : wP
22	Greatest Declination N	29·786	63·1	52·0	11·1	57·0	− 5·9	55·6	54·3	2·7	8·2	0·0	91	88·7	42·5	0·0	15·8	0·037	3·8	vP, wN
23	..	29·776	73·6	54·3	19·3	62·9	+ 0·1	59·2	56·1	6·8	16·5	0·0	79	130·8	47·5	2·0	15·8	0·048	1·0	sP: vP, wN : vP
24	..	29·681	73·1	56·5	16·6	63·5	+ 0·8	60·1	57·3	6·2	12·1	1·3	80	113·2	52·4	1·1	15·7	0·002	7·0	sP : mP
25	..	29·525	71·3	51·5	19·8	59·2	− 3·5	53·1	47·7	11·5	22·1	2·6	66	132·2	45·0	5·9	15·7	0·000	0·0	mP : vP, wN : vP
26	New Apogee	29·462	73·1	53·0	20·1	59·7	− 3·0	54·1	49·1	10·6	21·2	3·0	68	131·0	48·8	4·9	15·7	0·002	0·0	vP, wN : vN, vP
27	..	29·829	65·1	48·5	16·6	56·2	− 6·4	53·6	51·2	5·0	11·6	0·8	83	113·0	41·2	1·7	15·6	0·076	0·0	mP, mN : vP, vN
28	..	30·001	75·9	43·9	32·0	58·7	− 3·9	52·0	46·0	12·7	26·3	0·0	63	138·8	36·8	10·1	15·6	0·000	2·0	sP : vP, wN
29	In Equator	29·823	74·5	55·6	18·9	63·9	+ 1·3	59·7	56·2	7·7	18·0	0·4	77	126·4	53·9	5·6	15·5	0·329	6·0	vN, vP : mP
30	..	29·699	68·1	55·5	12·6	61·4	− 1·2	59·6	58·1	3·3	8·8	0·2	89	95·8	49·2	0·7	15·5	0·128	2·0	mP, wN : vP
31	..	29·442	67·7	57·0	10·7	61·7	− 0·9	60·5	59·5	2·2	5·1	0·0	93	93·1	53·2	0·2	15·4	0·444	16·0	mP, wN
Means	..	29·828	77·7	54·9	22·8	65·5	+ 2·9	59·7	55·1	10·4	19·7	2·2	70·2	130·2	48·1	6·8	16·0	Sum 2·137	3·0	....
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers. The results on July 5, 11, 18, 19, and 20 for Evaporation Temperature depend partly on values inferred from eye-observations, and those on July 22 and 23 for Air and Evaporation Temperatures are deduced entirely from eye-observations, on account of accidental loss of photographic register.

The values given in Columns 3, 4, 5, 14, and 15 are derived from eye-readings of self-registering thermometers.

The mean reading of the *Barometer* for the month was 29in·828, being 0in·019 *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 97°·1 on July 15; the lowest in the month was 43°·9 on July 28; and the range was 53°·2.
The mean of all the highest daily readings in the month was 77°·7, being 3°·5 *higher* than the average for the 40 years, 1841–1880.
The mean of all the lowest daily readings in the month was 54°·9, being 1°·7 *higher* than the average for the 40 years, 1841–1880.
The mean daily range was 22°·8, being 1°·8 *greater* than the average for the 40 years, 1841–1880.
The mean for the month was 65°·5, being 2°·9 *higher* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1881.	WIND AS DEDUCED FROM SELF-REGISTERING ANEMOMETERS. OSLER'S. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	ROBINSON'S. Horizontal Movement of the Air.	CLOUDS AND WEATHER. A.M.	P.M.
			lbs.	lbs.	lbs.	miles.		
July 1	SSE : SSW	SW : NNW	4·0	0·0	0·1	253	p.-cl : 7, th.-cl, ci.-s	1, ci : 6, cu.-s
2	Calm : Variable : N	N : NE : Calm	0·0	0·0	0·0	110	0 : 3, ci, ci.-s	9, cu.-s, cu, th.-cl, so.-ha : v, th.-cl, h
3	SW	W : WSW	3·1	0·0	0·1	359	h, m : 9, s, th.-cl, so.-ha	8, ci.-s, ci : 6, ci.-s, ci : 1, s
4	WSW	WSW	0·7	0·0	0·0	296	v, s : p.-cl, s, ci.-s, cu.-s : 0	0 : 0
5	WSW : Variable	SE	0·5	0·0	0·0	126	0 : 0	2, ci, ci.-s, th.-cl, so.-ha : li.-cl : 10, t.-sm, r
6	Variable : SW	WSW : W	5·2	0·0	0·5	415	10, t.-sm, hy.-r : 10, hy.-sh : 10, hy.-r, t	10, s, sc : 10 : 0
7	WSW : W	W : WSW	4·3	0·0	0·2	432	p.-cl : 7, cu.-s, cu	9, cu.-s, cu : p.-cl, so.-ha : 7, cu.-s
8	SW	SW : WSW	0·6	0·0	0·0	219	10 : 9, cu.-s, ci.-s	10, li.-shs : v
9	WSW	WSW : SW	0·3	0·0	0·0	233	p.-cl : 7, cu, cu.-s	7, cu.-s, slt.-r : 10, s
10	WSW : W : NW	NW : SW	2·0	0·0	0·1	321	10 : 7, cu, cu.-s	4, cu.-s : 7, ci.-cu, ci.-s, s
11	SW : SSW	SSW : S	1·3	0·0	0·1	268	p.-cl : 6, li.-cl, ci.-cu	3, ci : 0
12	SSE : SSW	SW : W : WNW	0·8	0·0	0·0	233	li.-cl : 9, ci.-cu, n, slt.-r	2, ci, cu.-s, cu, ci.-cu : 1, li.-cl
13	WSW	W : WSW : WNW	1·1	0·0	0·0	306	0 : 8, li.-cl, ci.-cu, so.-ha	6, ci.-s, ci, ci.-cu, so.-ha : 0, slt.-m
14	WSW : SW	SW : S	0·0	0·0	0·0	135	0, slt.-m : v, m	2, ci.-cu, ci, h : 0
15	Calm : NE : SW	Variable	0·0	0·0	0·0	115	0 : 2, th.-cl, h, m	2, ci : 6, cu.-s, ci.-cu, ci.-s, th.-cl
16	NE	NE : E : SE	0·0	0·0	0·0	180	p.-cl, s, cu.-s, l, li.-shs : 2, li.-cl	7, ci.-cu, ci, cu.-s : 10
17	ENE : NNE	WSW : SW	0·0	0·0	0·0	130	10 : 4, cu, th.-cl, h	v, th.-cl, h : 0
18	SW : WSW	WSW	0·9	0·0	0·1	246	0 : 0	4, li.-cl : 1, th.-cl, s, ci.-s
19	WSW : NW	N : NNW	0·3	0·0	0·0	160	s, ci.-s, li.-cl : 3, li.-cl, h	7, ci.-cu, th.-cl, h : 10, m
20	NNW	NW : NNW	0·4	0·0	0·0	215	10, l : 10, slt.-r	9, ci, cu.-s : 5, cu.-s, ci.-cu, s
21	NNW : N	NE : SE	0·9	0·0	0·0	159	s : 3, ci.-s, m	1, ci : v, s, ci.-s
22	SSE : SW	SW	2·5	0·0	0·2	284	10 : 10, s, slt.-r	10, sc, fq.-r : v
23	WSW	SW	2·4	0·0	0·2	298	v, s : 9, cu.-s, ci.-cu, ci.-s	10, slt.-sh : v : 10, r
24	SW	SSW : SW	7·0	0·0	0·5	372	p.-cl : 10	10, slt.-sh : 6, cu.-s, slt.-sh
25	SW	WSW : SW	2·9	0·0	0·2	391	p.-cl : 7, cu.-s, so.-ha	8, cu.-s, cu, th.-cl : 10
26	SW : NNW	NW : N : SW	3·4	0·0	0·1	259	0 : 8, cu.-s, cu, ci.-cu	6, cu.-s, cu, ci.-cu : 7, slt.-sh
27	WSW : N : NNE	NE : N	1·7	0·0	0·0	121	v : 10, glm	9, cu.-s, glm, shs.-r : 7, th.-cl, m
28	SW	SW	3·8	0·0	0·1	281	0, m : 3, th.-cl	5, ci, ci.-cu, ci.-s, so.-ha : 10
29	SW : WSW	WSW : SW : SSW	3·8	0·0	0·3	397	10, hy.-r : 7, cu, cu.-s, slt.-sh	7, cu.-s : 8
30	SSW : S	SSW : SW	2·2	0·0	0·1	268	v : 10, r	10, oc.-th.-r : 8
31	SSW	SW : WSW : WNW	9·9	0·0	0·9	442	p.-cl : 10, hy.-r	10, sc, li.-shs, w : 10, oc.-r
Means	...	...	..	..	0·1	259		
Number of Column for Reference.	21	22	23	24	25	26	27	28

The mean *Temperature of Evaporation* for the month was 59°·7, being 2°·0 *higher* than the average for the 20 years, 1849–1868.
The mean *Temperature of the Dew Point* for the month was 55°·1, being 1°·4 *higher* than the average for the 20 years, 1849–1868.
The mean *Degree of Humidity* for the month was 70·2, being 2·8 *less* than the average for the 20 years, 1849–1868.
The mean *Elastic Force of Vapour* for the month was 0^{in}·434, being 0^{in}·021 *greater* than the average for the 20 years, 1849–1868.
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 4^{grs}·8, being 0^{gr}·2 *greater* than the average for the 20 years, 1849–1868.
The mean *Weight of a Cubic Foot of Air* for the month was 525 grains, being 3 grains *less* than the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 6·1.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·43. The maximum daily amount of *Sunshine* was 13·8 hours on July 11.

The highest reading of the *Solar Radiation Thermometer* was 156°·5 on July 5; and the lowest reading of the *Terrestrial Radiation Thermometer* was 36°·8 on July 28.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 2·0; for the 6 hours ending 3 p.m., 0·6; and for the 6 hours ending 9 p.m., 0·4.

The *Proportions of Wind* referred to the cardinal points were N. 5, E. 2, S. 10, and W. 14.

The *Greatest Pressure of the Wind* in the month was 9^{lbs}·9 on the square foot on July 31. The mean daily *Horizontal Movement of the Air* for the month was 259 miles; the greatest daily value was 442 miles on July 31; and the least daily value 110 miles on July 2.

Rain fell on 12 days in the month, amounting to 2^{in}·137, as measured by gauge No. 6 partly sunk below the ground; being 0^{in}·301 *less* than the average fall for the 40 years, 1841–1880.

MONTH and DAY, 1881.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	TEMPERATURE. Of the Air. Lowest.	TEMPERATURE. Of the Air. Daily Range.	TEMPERATURE. Of the Air. Mean of 24 Hourly Values.	TEMPERATURE. Of the Air. Excess of Mean above Average of 20 Years.	TEMPERATURE. Of Evaporation. Mean of 24 Hourly Values.	TEMPERATURE. Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Difference. Greatest of 24 Hourly Values.	Difference. Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	TEMPERATURE. Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	hours.	hours.	in.		
Aug. 1	..	29·624	72·8	49·5	23·3	61·4	− 1·2	57·0	53·2	8·2	17·6	0·0	75	128·8	41·4	5·3	15·3	0·077	3·0	sP : wP : sP, ssN
2	..	29·917	75·5	55·0	20·5	63·0	+ 0·3	57·8	53·4	9·6	16·9	0·6	71	126·8	51·3	3·3	15·3	0·000	0·0	vP : vP, vN
3	First Qr.	30·067	73·6	50·2	23·4	61·9	− 0·8	58·4	55·4	6·5	13·3	0·4	80	111·3	42·6	2·3	15·2	0·000	2·0	mP : wP, wN : wP
4	..	30·116	83·0	58·3	24·7	66·5	+ 3·8	62·6	59·5	7·0	18·4	0·2	79	128·0	53·8	7·5	15·2	0·000	0·0	vP
5	Greatest Declination S	29·884	85·4	51·2	34·2	68·4	+ 5·7	62·1	57·2	11·2	23·5	0·6	66	139·3	39·7	12·3	15·1	0·000	4·0	sP : wP, wN : mP
6	..	29·921	76·9	55·5	21·4	63·8	+ 1·1	58·1	53·3	10·5	20·1	2·9	69	133·0	49·6	8·5	15·1	0·000	2·5	mP : vP, wN
7	..	29·944	76·1	50·0	26·1	62·0	− 0·7	56·8	52·3	9·7	17·0	1·6	71	127·0	39·9	10·4	15·0	0·000	9·5	mP
8	..	29·625	78·7	54·2	24·5	62·7	0·0	59·8	57·4	5·3	17·3	0·0	83	133·8	47·9	2·9	15·0	0·433	15·5	mP : wP : ssN, vP
9	Perigee: Full	29·475	72·4	52·8	19·6	59·9	− 2·8	56·0	52·6	7·3	15·8	1·1	77	123·4	47·0	3·7	14·9	0·010	6·0	mP, mN : wP, wN : vP
10	..	29·657	70·4	54·3	16·1	59·9	− 2·8	55·7	52·0	7·9	14·6	2·7	76	115·2	48·3	2·8	14·9	0·000	0·0	sP : vP : wN, vP
11	In Equator	29·769	70·1	50·0	20·1	59·9	− 2·8	55·5	51·6	8·3	16·0	1·5	74	122·3	42·9	6·6	14·8	0·010	6·0	sP : wP, wN : vP
12	..	29·584	60·4	53·0	7·4	56·1	− 6·5	55·6	55·1	1·0	4·0	0·0	97	72·5	52·1	0·0	14·7	1·306	0·0	vP : vP, vN
13	..	29·516	59·5	47·8	11·7	54·4	− 8·1	51·5	48·7	5·7	9·3	1·4	81	92·3	42·9	2·2	14·7	0·000	0·0	vP, wN
14	..	29·643	63·3	52·3	11·0	56·6	− 5·8	52·8	49·3	7·3	11·6	4·6	77	89·3	49·6	0·0	14·6	0·001	0·0	wP : mP
15	..	29·668	68·1	52·1	16·0	57·2	− 5·1	54·1	51·2	6·0	13·5	0·4	81	117·9	47·6	2·6	14·6	0·003	0·0	sP : vP : mP
16	Last Qr.	29·434	72·1	55·9	16·2	60·6	− 1·5	58·4	56·5	4·1	11·7	0·2	87	121·0	53·6	2·0	14·5	0·043	0·0	vP, wN
17	..	29·286	68·1	53·5	14·6	58·3	− 3·6	55·3	52·6	5·7	14·8	0·6	81	123·2	50·0	5·2	14·4	0·099	0·0	vP, wN : vP, ssN
18	Greatest Declination N	29·452	68·8	53·1	15·7	58·8	− 3·0	55·2	52·0	6·8	13·3	1·9	78	117·5	49·3	5·0	14·4	0·000	1·5	wP : wP, wN : mP
19	..	29·447	67·0	51·0	16·0	58·4	− 3·2	56·1	54·0	4·4	12·4	1·0	85	107·0	46·0	1·6	14·3	0·112	10·2	mP, mN : wP : mP
20	..	29·712	70·4	48·0	22·4	57·5	− 3·9	52·8	48·5	9·0	17·3	1·5	72	123·2	43·0	8·0	14·3	0·000	2·4	sP : vP, wN : vP
21	..	29·634	65·0	48·3	16·7	54·9	− 6·4	53·5	52·1	2·8	11·6	0·0	90	100·3	44·0	1·2	14·2	0·486	2·9	vP, wN : sP, sN
22	Apogee	29·694	71·4	47·0	24·4	57·8	− 3·5	55·0	52·5	5·3	15·5	0·0	82	127·6	42·7	6·7	14·1	0·102	2·3	mP : mP, mN : sP
23	..	29·533	69·2	55·0	14·2	59·6	− 1·6	57·4	55·5	4·1	12·4	0·0	87	114·9	52·6	1·2	14·1	0·289	6·7	mP : vP, sN
24	New	29·512	65·6	51·6	14·0	57·8	− 3·3	54·6	51·8	6·0	14·8	0·0	81	108·3	47·5	7·5	14·0	0·023	2·3	vP, mN
25	..	29·514	64·4	51·6	12·8	58·3	− 2·7	57·4	56·6	1·7	5·1	0·0	94	97·8	47·0	0·0	13·9	0·300	12·2	mP : wP, wN
26	In Equator	29·288	70·2	52·6	17·6	61·0	+ 0·1	57·7	54·8	6·2	15·5	0·0	81	123·3	49·0	9·7	13·9	0·232	13·2	wP : mP : sP, sN
27	..	29·580	66·2	49·6	16·6	56·2	− 4·6	52·6	49·2	7·0	14·2	1·8	78	116·0	44·0	7·8	13·8	0·000	2·8	sP : wP, wN : vP
28	..	29·898	68·3	43·1	25·2	54·9	− 5·8	50·8	46·9	8·0	18·4	0·7	74	112·8	37·1	10·7	13·8	0·000	1·8	— : mP, wN
29	..	29·849	62·0	50·0	12·0	57·0	− 3·6	55·6	54·3	2·7	5·1	0·0	91	88·3	45·9	0·1	13·7	0·270	15·5	vP : vP, sN
30	..	29·675	69·7	52·2	17·5	58·8	− 1·6	56·9	55·2	3·6	9·7	0·0	88	124·0	50·5	2·2	13·7	0·082	3·8	vP, wN : vP, vN
31	..	29·951	57·5	49·6	7·9	52·5	− 7·8	49·9	47·3	5·2	11·2	2·0	83	90·3	44·6	0·8	13·6	0·010	1·5	vP
Means	..	29·673	69·7	51·6	18·2	59·2	− 2·6	55·9	53·0	6·3	13·9	0·9	80·3	114·7	46·6	4·5	14·5	Sum 3·888	4·1	..
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, and 15 are derived from eye-readings of self-registering thermometers.

The mean reading of the *Barometer* for the month was 29in·673, being 0in·126 *lower* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 85°·4 on August 5; the lowest in the month was 43°·1 on August 28; and the range was 42°·3.
The mean of all the highest daily readings in the month was 69°·7, being 3°·3 *lower* than the average for the 40 years, 1841–1880.
The mean of all the lowest daily readings in the month was 51°·6, being 1°·7 *lower* than the average for the 40 years, 1841–1880.
The mean daily range was 18°·2, being 1°·5 *less* than the average for the 40 years, 1841–1880.
The mean for the month was 59°·2, being 2°·6 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1881.	Wind as deduced from Self-Registering Anemometers.						Clouds and Weather.	
	Osler's.					Robinson's.		
	General Direction.		Pressure on the Square Foot.			Horizontal Movement of the Air.		
	A.M.	P.M.	Greatest.	Least.	Mean of 24 Hourly Measures.		A.M.	P.M.
			lbs.	lbs.	lbs.	miles.		
Aug. 1	WNW : SW : S	SE : NE	0·0	0·0	0·0	119	p.-cl : 3, ci	9, cu.-s, ci.-cu, ci : 10, fq.-r
2	N : NE	Variable	1·2	0·0	0·0	140	10 : 10	7, ci.-cu, ci, cu.-s : 7, d, m
3	SW	SW	3·1	0·0	0·1	292	v : 10, th.-cl	10, th.-cl : 0, h
4	SW	WSW : SSW	0·0	0·0	0·0	226	p.-cl : 10 : v, h	2, cu, ci.-cu, h : 0
5	SSW	SSW : WSW	0·5	0·0	0·0	205	0 : 0	0 : v, cu.-s, ci.-cu, li.-cl
6	WSW	WSW	1·8	0·0	0·2	319	s : 2, cu	7, cu, cu.-s : 0, d
7	WSW : SW	SW : SSW	1·0	0·0	0·0	244	0 : 10, li.-cl	v, li.-cl : 1, li.-cl
8	SSW : SW	SW : SSW	1·7	0·0	0·1	318	p.-cl : 7, ci.-cu, ci.-s	8,cu.-s,ci.-cu,ci: 10, r : v, oc.-r
9	SW : WSW	W: WNW: WSW	7·4	0·0	1·1	495	p.-cl, sh.-r : 10, sc	7, cu.-s, ci.-cu : 9, cu.-s, ci.-cu
10	SW	WSW : WNW	6·0	0·0	0·7	408	10 : 10	10 : v : 0
11	WSW	SW:WSW:NNW	7·6	0·0	1·1	507	0 : 4, cu, ci	9, cu.-s, w : 10, sc, oc.-r
12	SW : SE	Calm : SW : N	0·0	0·0	0·0	109	10, slt.-r : 10, hy.-r	10, c.-hy.-r, gt.-glm : 10, c.-r
13	NNW : NW	WNW: W: WSW	4·0	0·0	0·1	347	10 : 7, cu.-s	10 : 10, s, cu.-s
14	WSW: W: WNW	WNW	2·3	0·0	0·1	355	10 : 10	10, cu.-s : 10
15	WSW	WSW : SW	1·5	0·0	0·0	286	10 : 8, cu.-s	8,cu.-s,ci.-cu,cu,oc.-th.-r: 10, oc.-th.-r
16	WSW	SW	0·0	0·0	0·0	203	10 : 10, m	7,cu,cu.-s,ci.-cu: 10, m.-r : 10, r
17	WSW	WSW : SW	4·0	0·0	0·1	362	10, oc.-r : 7, cu, ci.-cu, cu.-s	8, cu, cu.-s, shs.-r : v, s, cu.-s, shs.-r
18	WSW: WNW: W	NW: SW: SSW	1·2	0·0	0·0	300	10, s : 8, cu.-s	8, cu.-s, cu, ci.-cu : v, cu.-s, ci
19	SSW : SSE : S	SW : WSW	8·0	0·0	0·9	425	p.-cl : 10, r : 10, fq.-m.-r	9,ci.-cu,m.-r : v, w : 0
20	WSW	WSW: SW: SSW	2·7	0·0	0·1	284	0 : li.-cl : 6, ci, so.-ha	6,cu.-s,ci.-cu,cu,ci,so.-ha: 10
21	S : SSW	Variable	0·5	0·0	0·0	118	10 : 8, cu.-s, ci.-s	10, fq.-hy.-r : v, th.-cl, m, slt.-f, l
22	SSW: SW: WSW	WSW : SSW	0·0	0·0	0·0	196	p.-cl : 10 : 6, cu	7,cu.cu.-s.ci.-cu,hy.-sh : 9
23	SE	SE : SW	0·0	0·0	0·0	137	10 : 10.s,ci.-s,slt.-r: 6,cu.-s,ci.-cu,ci	10, r : 10, r : 8,cu.-s,ci.-cu,slt.-r
24	WSW	WSW : SW	5·9	0·0	0·6	434	10, slt.-r : 8, cu.-s, ci.-cu, li.-cl	7,cu.-s,ci.-cu,cu,li.-shs,l.t: 0
25	SW : SSW : S	SSW	7·6	0·0	1·4	464	0 : 10, r	10, sc, li.-shs, w : 10, fq.-r, w : 10, oc.-r, w
26	SW : WSW	SW	12·0	0·0	1·5	548	10, oc.-r : p.-cl,ci.-cu,cu.-s: 8,ci.-cu,cu.-s,w	4,cu,ci.-cu,ci,slt.-sh, w, t : 8,cu.-s,hy.-shs : v, th.-cl
27	SW : WSW	NW : NNW	0·0	0·0	0·0	218	0 : 4, cu, ci.-cu	8, ci.-cu, cu.-s, cu : v, l
28	SW : WSW	WSW: SW: SSW	5·6	0·0	0·0	264	0 : 0 : 5,th.-cl,slt.-m	6, cu, th.-cl : v, cu.-s, ci.-cu
29	S : SSW	SSW	4·7	0·0	0·3	384	v : 10, sc, fq.-r	10, sc, oc.-th.-r : 10, r
30	SSE : WSW	W : NNW : N	5·6	0·0	0·2	290	10, r : 10	7, cu, cu.-s, ci, m, h : 10, slt.-r
31	N	NNW	2·6	0·0	0·1	358	10 : 10, li.-shs	9, cu.-s, ci.-cu : v, ci.-s, th.-r
Means	...	...	..	..	0·3	302		
Number of Column for Reference.	21	22	23	24	25	26	27	28

The mean *Temperature of Evaporation* for the month was 55°·9, being 2°·0 *lower* than
The mean *Temperature of the Dew Point* for the month was 53°·0, being 1°·4 *lower* than
The mean *Degree of Humidity* for the month was 80·3, being 3·8 *greater* than
The mean *Elastic Force of Vapour* for the month was 0^{in}·403, being 0^{in}·021 *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 4^{grs}·5, being 0^{gr}·2 *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 529 grains, being 1 grain *greater* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 7·4.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·31. The maximum daily amount of *Sunshine* was 12·3 hours on August 5.

The highest reading of the *Solar Radiation Thermometer* was 139°·3 on August 5; and the lowest reading of the *Terrestrial Radiation Thermometer* was 37°·1 on August 25.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 1·8; for the 6 hours ending 3 p.m., 1·0; and for the 6 hours ending 9 p.m., 1·5.

The *Proportions of Wind* referred to the cardinal points were N. 3, E. 1, S. 12, and W. 15.

The *Greatest Pressure of the Wind* in the month was 12^{lbs}·0 on the square foot on August 26. The mean daily *Horizontal Movement of the Air* for the month was 302 miles; the greatest daily value was 548 miles on August 26; and the least daily value 109 miles on August 12.

Rain fell on 17 days in the month, amounting to 3^{in}·888, as measured by gauge No. 6 partly sunk below the ground; being 1^{in}·433 *greater* than the average fall for the 40 years, 1841–1880.

MONTH and DAY, 1881.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Of the Air. Lowest.	Of the Air. Daily Range.	Of the Air. Mean of 24 Hourly Values.	Of the Air. Excess of Mean above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Difference. Greatest of 24 Hourly Values.	Difference. Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	TEMPERATURE. Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°					°					h			
Sept. 1	First Qr.	30·000	57·0	49·0	8·0	52·1	− 8·0	50·0	47·9	4·2	9·4	1·2	85	65·0	44·8	0·9	13·5	0·003	0·0	mP : vP, wN
2	Greatest Declination S	29·956	59·2	50·4	8·8	53·9	− 6·1	52·1	50·3	3·6	8·2	0·6	87	76·6	49·5	0·1	13·4	0·000	0·0	wP : vP
3	..	29·847	62·0	49·8	12·2	55·4	− 4·4	53·6	51·9	3·5	7·4	0·2	89	80·0	43·5	0·2	13·4	0·001	0·0	mP : wP, wN : mP
4	..	29·724	63·0	44·2	18·8	54·1	− 5·6	52·4	50·7	3·4	8·6	0·0	88	93·0	38·9	2·2	13·3	0·000	0·0	mP : vP
5	..	29·542	62·7	49·0	13·7	•56·0	− 3·5	54·3	52·7	3·3	8·4	0·0	89	100·0	39·6	0·0	13·2	0·188	2·0	vP : mP, wN
6	Perigee	29·375	66·9	54·0	12·9	58·3	− 1·0	55·2	52·4	5·9	14·2	0·4	81	118·3	50·7	9·7	13·2	0·200	13·0	wP, wN : vP, sN : mP
7	..	29·481	67·6	52·2	15·4	57·5	− 1·5	55·5	53·7	3·8	12·8	0·2	87	103·9	47·0	2·6	13·1	0·012	0·0	— : wN, vP
8	Full In Equator	29·574	65·0	47·8	17·2	56·7	− 2·1	54·2	51·9	4·8	11·3	0·2	84	95·3	41·7	0·0	13·0	0·010	0·0	wP : vP
9	..	29·704	66·1	47·4	18·7	56·9	− 1·6	54·4	52·1	4·8	11·2	0·8	84	97·0	39·2	0·5	13·0	0·008	0·0	— : wN, wP : vP
10	..	29·823	58·5	47·5	11·0	53·9	− 4·4	52·5	51·1	2·8	5·7	0·4	90	82·7	39·2	0·3	12·9	0·068	0·0	mN : wP, wN : wP
11	..	29·792	58·9	51·2	7·7	54·1	− 4·0	53·2	52·3	1·8	4·2	0·2	94	76·6	50·5	0·0	12·9	0·109	0·0	wP
12	..	29·833	58·2	53·4	4·8	55·3	− 2·7	54·2	53·1	2·2	6·1	0·0	93	73·2	52·0	0·0	12·8	0·022	0·0	— : wP, wN : wN, vP
13	..	29·927	68·1	51·0	17·1	56·0	− 1·8	54·1	52·3	3·7	11·3	1·0	88	108·4	46·0	1·7	12·7	0·000	0·0	vP
14	Greatest Declination N	29·943	68·4	49·2	19·2	56·8	− 0·8	53·6	50·6	6·2	14·9	1·0	80	110·3	42·0	7·1	12·7	0·000	0·0	mP : vP, wN
15	Last Qr.	29·955	64·1	47·6	16·5	54·1	− 3·3	52·8	51·5	2·6	11·2	0·0	91	98·6	40·3	1·6	12·6	0·008	0·0	vP, vN : wN, vP
16	..	30·013	63·1	40·0	23·1	51·6	− 5·7	50·0	48·4	3·2	11·6	0·0	89	85·1	35·5	4·6	12·6	0·000	0·0	vP, wN
17	..	29·839	67·9	48·0	19·9	57·7	+ 0·6	54·6	51·8	5·9	17·5	0·0	81	113·6	39·0	5·4	12·5	0·004	2·0	mP : sP, vN
18	Apogee	29·521	72·9	54·0	18·9	61·1	+ 4·2	58·8	56·8	4·3	13·1	0·4	86	112·3	49·2	4·3	12·4	0·155	6·0	ssP, ssN : mP
19	..	29·650	69·1	51·3	17·8	60·1	+ 3·3	58·1	56·3	3·8	10·3	0·8	88	110·0	44·0	1·3	12·3	0·000	0·0	wP, wN : vP
20	..	29·626	70·4	49·9	20·5	59·6	+ 3·0	57·0	54·7	4·9	11·7	0·0	84	125·4	43·3	4·0	12·3	0·050	4·0	vP : mP : wP
21	..	29·309	66·1	52·2	13·9	59·1	+ 2·7	57·7	56·5	2·6	8·4	0·0	92	93·4	48·0	0·0	12·2	0·470	3·0	— : sP
22	In Equator	29·421	59·7	49·0	10·7	53·5	− 2·7	51·9	50·4	3·1	7·2	0·0	89	70·1	46·0	0·0	12·2	0·236	0·0	mP : wP, wN : sN, vP
23	New	29·777	61·8	53·0	8·8	55·9	− 0·2	55·1	54·4	1·5	4·6	0·0	94	82·2	49·8	0·0	12·1	0·000	0·0	wP
24	..	29·989	66·1	54·8	11·3	57·9	+ 2·0	56·5	55·2	2·7	7·4	0·0	91	105·6	49·5	0·5	12·0	0·278	2·3	wP : wP, wN
25	..	29·879	70·4	50·0	20·4	59·7	+ 3·9	57·3	55·2	4·5	12·4	0·0	86	117·2	45·0	4·4	11·9	0·364	9·7	wP : mP
26	..	29·926	65·4	47·3	18·1	55·0	− 0·7	52·8	50·7	4·3	11·8	0·6	86	117·5	40·2	2·9	11·9	0·000	0·0	mP : vP, wN
27	..	30·014	64·2	47·4	16·8	53·0	− 2·5	51·2	49·4	3·6	10·3	0·0	87	105·1	39·8	1·4	11·8	0·002	0·0	mP : vP, wN
28	..	30·143	64·1	42·5	21·6	52·3	− 3·1	50·3	48·3	4·0	12·8	0·0	86	115·0	34·8	7·3	11·7	0·000	0·0	wP : vP
29	Greatest Declination S	30·215	65·8	40·5	25·3	51·5	− 3·7	49·8	48·1	3·4	11·5	0·0	89	115·2	36·0	5·5	11·7	0·000	0·0	vP : mP
30	First Qr.	30·196	64·9	39·0	25·9	50·5	− 4·4	49·0	47·4	3·1	13·1	0·0	90	117·2	31·7	5·3	11·6	0·000	0·0	mP
Means	..	29·800	64·6	48·8	15·8	55·7	− 1·8	53·7	51·9	3·7	10·3	0·3	87·6	99·8	43·2	2·5	12·6	Sum 2·188	1·4	..
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, and 15 are derived from eye-readings of self-registering thermometers.

The mean reading of the *Barometer* for the month was 29$^{\text{in}}$·800, being 0$^{\text{in}}$·013 *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 72°·9 on September 18; the lowest in the month was 39°·0 on September 30; and the range was 33°·9.

The mean of all the highest daily readings in the month was 64°·6, being 3°·0 *lower* than the average for the 40 years, 1841–1880.

The mean of all the lowest daily readings in the month was 48°·8, being 0°·4 *lower* than the average for the 40 years, 1841–1880.

The mean daily range was 15°·8, being 2°·6 *less* than the average for the 40 years, 1841–1880.

The mean for the month was 55°·7, being 1°·8 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY. 1881.	Wind as deduced from Self-registering Anemometers. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	Clouds and Weather. A.M.	P.M.
			lbs.	lbs.	lbs.	miles.		
Sept. 1	NNW	NNW : N	9·1	0·0	1·1	467	10 : 10, cu.-s, s : 8, cu.-s	10, oc.-th.-r : 10, slt.-r
2	N	N	4·5	0·0	0·5	402	10 : 10	10, oc.-slt.-r : 10, slt.-r
3	NNW	NNW : NW : N	0·0	0·0	0·0	208	10 : 10, oc.-th.-r	9, ci.-cu : v, li.-cl, m, d
4	NW : SW	SW : NE	0·0	0·0	0·0	118	v : 10, m	10, m, glm : 8 : v, d
5	ENE	E : ESE : ENE	0·0	0·0	0·0	196	p.-cl : 10, slt.-r	10, cu.-s : 10 : 10, hy.-r
6	SE : SW	SSW : SE : E	3·6	0·0	0·2	291	10, hy.-r : 5,ci.-s,li.-cl,ci.-cu,li.-shs	5,cu.-s,ci.-cu,cu,slt.-sh: p.-cl : 10, r
7	NE : NNW	WSW : SSW	0·0	0·0	0·0	139	10, s : 10, slt.-f, glm	7,cu,ci.-cu,cu.-s,h,slt.-r: v, li.-cl, cu.-s, ci.-s
8	SW : ENE	NE:NNW:NW	0·0	0·0	0·0	132	10, cu.-s, ci.-s : 8, li.-cl, ci.-s, tk.-f, m, d	10, ci.-s, h, oc.-slt.-r : 10, fq.-m.-r
9	NW : NNW	NNW : NNE	0·0	0·0	0·0	170	10, slt.-r : 9, ci.-cu, ci.-s, ci	9,cu.-s,ci.-cu,cu,h: 9, ci.-cu : 3,ci.-cu,d,h
10	NNW	N	1·7	0·0	0·1	264	h : 9, oc.-m.-r	10, fq.-m.-r : 10, r
11	N	N : NNE	1·0	0·0	0·0	301	10 : 10, slt.-r : 10, slt.-r	10, slt.-sh : 10
12	NNW : NW	WNW : NNW	0·0	0·0	0·0	217	10 : 10 : 10, glm	10, fq.-th.-r : 10, oc.-slt.-r
13	NNW : SW	SW : SSW	0·0	0·0	0·0	149	10 : 10, m, slt.-f	6, ci.-cu, cu, ci, cu.-s: 1, s, th.-cl, m, lu.-ha
14	SW : WSW	WSW: NW: Calm	0·0	0·0	0·0	164	s, th.-cl, m : 3, ci	7, cu.-s, ci.-cu, ci : 4, cu.-s, s, m, d
15	Calm	N : NNE	0·0	0·0	0·0	73	p.-cl, m, d : 10, tk.-f, m, slt.-r	6,th.-cl,cu.-s,cu,ci.-cu: 4, th.-cl, m, d
16	Calm	ENE : E : SSE	0·0	0·0	0·0	69	0, m, d : tk.-f, d	2,th.-ci,cu.-s,slt.-f,h: 0, f
17	SSE : S	S : SSE	1·2	0·0	0·0	181	0, f : 5, ci	7, ci, ci.-cu, cu.-s : 10
18	Variable : Calm	SW	0·0	0·0	0·0	147	10, fq.-hy.-r : 8, cu.-s, cu, slt.-r	3, ci.-cu, h, tk.-f : 7,cu.-s,ci.-cu,l,slt.-r
19	SW	WSW: SW: SSW	0·0	0·0	0·0	216	v : 9, slt.-r	8,cu.-s,ci.-cu,glm,slt.-sh: 0, d
20	SSE	SE : E	0·9	0·0	0·0	197	v : 8, li.-cl, ci.-cu	8,cu,cu.-s,ci,ci.-cu,ci.-s: 10, l, r
21	E : SE : S	SSW : SW	0·9	0·0	0·0	197	10,t.-sm,hy.-r: 10 : 10, se, fq.-r	10 : v, th.-cl, h
22	WSW	WSW: W: NNW	3·0	0·0	0·2	304	10 : 10, m	10, th.-cl : 10, r : 10, th.-r
23	NNW : NE	E : ENE	0·7	0·0	0·0	208	10 : 10	10 : 10, slt.-r
24	NE: ESE: SE	SSE: SSW: S	0·2	0·0	0·0	149	10 : 8, ci.-s	10, cu.-s, cu : 10, hy.-r
25	S : WSW	WSW : SW	1·5	0·0	0·1	259	10, c.-r : 10, r	7, cu, ci : 0
26	SW : SSW	NW : SW	0·8	0·0	0·0	214	p.-cl : 10, s, ci.-s	8, cu.-s, ci.-cu, sh.-r: 0, m, d
27	SW : WSW	WSW: NW: Calm	0·0	0·0	0·0	146	v : 10, m, slt.-f, slt.-r	9, cu.-s, cu : 0, m, f, hy.-d
28	Calm : N : NE	NE: Calm	0·0	0·0	0·0	102	0, f, d : 0, f	2, cu : 0, slt.-f, hy.-d
29	Calm	SE : S	0·0	0·0	0·0	74	0, f : 0, f	5, ci.-cu, cu.-s, cu : 3, ci.-cu, hy.-d
30	Calm : NE	ENE : ESE	0·0	0·0	0·0	105	0, hy.-d, f : 0, tk.-f	4, cu, cu.-s : 0, d, slt.-f
Means	...	...	..	..	0·1	195		
Number of Column for Reference.	21	22	23	24	25	26	27	28

The mean *Temperature of Evaporation* for the month was 53°·7, being 0°·6 *lower* than
The mean *Temperature of the Dew Point* for the month was 51°·9, being 0°·5 *higher* than
The mean *Degree of Humidity* for the month was 87·6, being 7·5 *greater* than
The mean *Elastic Force of Vapour* for the month was 0in·386, being 0in·007 *greater* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 4grs·3, being 0gr·1 *greater* than
The mean *Weight of a Cubic Foot of Air* for the month was 535 grains, being 3 grains *greater* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 7·1.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·20. The maximum daily amount of *Sunshine* was 9·7 hours on September 6.

The highest reading of the *Solar Radiation Thermometer* was 125°·4 on September 20; and the lowest reading of the *Terrestrial Radiation Thermometer* was 31°·7 on September 30.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 1·0; for the 6 hours ending 3 p.m., 0·3; and for the 6 hours ending 9 p.m., 0·1.

The *Proportions of Wind* referred to the cardinal points were N. 9, E. 4, S. 8, and W. 7. Two days were calm.

The *Greatest Pressure of the Wind* in the month was 9lbs·1 on the square foot on September 1. The mean daily *Horizontal Movement of the Air* for the month was 195 miles; the greatest daily value was 467 miles on September 1; and the least daily value 69 miles on September 16.

Rain fell on 15 days in the month, amounting to 2in·188, as measured by gauge No. 6 partly sunk below the ground; being 0in·107 *less* than the average fall for the 40 years, 1841–1880.

Month and Day, 1881.	Phases of the Moon.	Barometer. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	Temperature. Of the Air. Highest.	Temperature. Of the Air. Lowest.	Temperature. Of the Air. Daily Range.	Temperature. Of the Air. Mean of 24 Hourly Values.	Temperature. Of the Air. Excess of Mean above Average of 20 Years.	Temperature. Of Evaporation. Mean of 24 Hourly Values.	Temperature. Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Greatest of 24 Hourly Values.	Difference between the Air Temperature and Dew Point Temperature. Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	Temperature. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Temperature. Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	hours.	hours.	in.		
Oct. 1	..	30·095	63·0	38·3	24·7	50·1	− 4·6	47·7	45·2	4·9	14·4	0·0	84	111·5	32·7	8·1	11·6	0·000	0·0	wP : mP
2	..	29·992	60·3	42·0	18·3	49·9	− 4·5	47·2	44·3	5·6	14·4	0·0	82	105·6	31·8	9·3	11·5	0·000	0·0	mP
3	..	29·992	61·6	42·0	19·6	49·6	− 4·4	47·4	45·0	4·6	15·2	0·0	85	125·0	30·5	5·9	11·4	0·000	0·0	wP : mP
4	Perigee	30·025	56·2	39·3	16·9	47·8	− 5·9	44·6	41·1	6·7	15·4	1·3	78	114·5	31·2	3·5	11·4	0·013	0·0	mP, mN : wN, sP
5	In Equator	30·027	48·9	36·0	12·9	42·5	−10·9	40·8	38·8	3·7	10·1	0·0	87	81·5	26·6	1·3	11·3	0·000	0·0	sP : vP : sP
6	..	30·116	53·5	35·2	18·3	46·1	− 6·9	44·8	43·4	2·7	5·8	0·4	91	60·0	26·1	0·0	11·2	0·012	0·0	ssP : wN, wP : mP
7	Full	30·276	56·0	45·0	11·0	48·7	− 4·0	46·2	43·5	5·2	10·2	1·0	82	96·8	36·8	2·3	11·2	0·000	0·0	wP : sP
8	..	29·886	47·0	44·0	3·0	45·8	− 6·7	45·6	45·4	0·4	2·5	0·0	99	57·2	43·1	0·0	11·1	0·672	2·0	wN : sN, vP
9	..	29·657	51·2	43·0	8·2	46·6	− 5·7	45·9	45·1	1·5	5·3	0·0	95	71·4	39·2	0·0	11·0	0·002	0·0	wP : mP, wN
10	..	29·827	58·4	38·9	19·5	48·2	− 3·9	46·1	43·8	4·4	9·6	1·2	85	84·2	32·5	0·6	11·0	0·000	1·8	sP : mP
11	..	29·617	62·4	49·0	13·4	55·3	+ 3·4	53·2	51·2	4·1	6·7	1·7	87	89·9	42·0	0·2	10·9	0·016	3·2	wP
12	Greatest Declination N	29·635	57·2	46·1	11·1	51·4	− 0·3	49·1	46·7	4·7	7·8	1·5	84	81·5	40·1	0·1	10·9	0·024	0·0	mP : mP, mN
13	..	29·597	55·0	44·0	11·0	49·4	− 2·2	47·0	44·4	5·0	12·6	0·0	84	87·7	37·2	2·3	10·8	0·344	1·8	mP : mP, wN
14	..	29·121	59·4	43·9	15·5	53·3	+ 1·9	49·6	45·9	7·4	14·0	0·2	76	92·2	37·7	5·1	10·7	0·077	12·2	..
15	Last Qr.	29·785	50·2	37·2	13·0	42·7	− 8·6	39·9	36·5	6·2	11·7	1·5	79	88·0	31·9	6·3	10·7	0·047	0·0	..
16	Apogee	30·168	46·8	30·8	16·0	38·2	−13·0	36·3	33·7	4·5	11·8	0·0	84	75·2	25·0	3·7	10·6	0·004	0·0	..
17	..	30·214	54·5	26·2	28·3	39·2	−11·9	37·5	35·3	3·9	13·4	0·0	86	101·9	21·0	6·3	10·5	0·000	0·0	..
18	..	30·108	52·8	31·4	21·4	43·0	− 8·0	40·8	38·2	4·8	11·6	0·0	83	105·2	28·1	8·1	10·5	0·000	1·5	..
19	In Equator	29·952	50·5	37·0	13·5	43·1	− 7·7	40·6	37·6	5·5	11·5	0·5	81	93·2	29·8	8·3	10·4	0·000	4·8	..
20	..	29·634	52·0	38·9	13·1	45·7	− 4·9	42·3	38·4	7·3	11·4	3·0	76	88·4	32·7	7·1	10·3	0·000	5·2	-- : mP
21	..	29·456	48·7	43·3	5·4	45·7	− 4·7	45·0	44·2	1·5	8·0	0·0	95	62·6	42·2	0·0	10·3	0·244	4·8	wP, wN : mP : wP
22	..	29·242	51·0	45·5	5·5	47·7	− 2·4	47·3	46·9	0·8	2·5	0·0	97	54·6	44·0	0·0	10·2	0·281	4·5	..
23	New	29·254	52·0	48·0	4·0	49·8	+ 0·1	49·8	49·8	0·0	0·8	0·0	100	60·9	47·3	0·0	10·2	0·958	4·2	..
24	..	29·47[illegible]	48·1	44·5	3·6	46·9	− 2·5	46·6	46·3	0·6	2·0	0·0	98	51·8	43·0	0·0	10·1	0·011	0·0	..
25	..	29·029	51·1	37·6	13·5	43·8	− 5·3	42·0	39·8	4·0	8·8	0·0	86	92·8	32·0	4·2	10·0	0·000	0·0	— : vP, wN : sP
26	Greatest Declination S	29·89[illegible]	51·0	37·9	13·1	43·5	− 5·3	41·8	39·8	3·7	9·0	0·0	87	88·7	31·0	3·0	10·0	0·000	0·3	mP : sP
27	..	30·038	46·1	37·0	9·1	41·3	− 7·2	39·9	38·1	3·2	7·3	0·9	89	64·4	30·0	0·5	9·9	0·006	0·7	sP, vN
28	..	29·988	47·1	34·2	12·9	42·1	− 6·1	39·5	36·3	5·8	12·2	0·0	81	76·5	26·7	3·8	9·8	0·000	0·0	sP : vP
29	..	29·959	44·6	35·0	9·6	38·5	− 9·4	37·1	35·2	3·3	10·1	1·3	88	85·4	30·0	1·0	9·8	0·000	1·0	sP
30	First Qr.	30·052	44·4	31·3	13·1	37·0	−10·6	35·1	32·4	4·6	10·1	0·0	84	77·8	25·0	3·9	9·7	0·000	0·0	sP
31	Perigee	29·992	42·7	26·9	15·8	33·4	−13·9	32·6	31·1	2·3	8·8	0·0	91	61·7	19·6	2·2	9·7	0·000	0·8	sP : vP : ssP
Means	..	29·829	52·4	39·0	13·4	45·4	− 5·7	43·5	41·4	4·0	9·5	0·5	86·6	83·5	33·1	3·1	10·6	Sum 2·711	1·6	....
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers. The results on October 18, 19, 22, and 31 for Evaporation Temperature depend partly on values inferred from eye-observations, on account of accidental loss of photographic register.

The values given in Columns 3, 4, 5, 14, and 15 are derived from eye-readings of self-registering thermometers.

The Electrometer was not in action from October 14 to 19 and again from October 22 to 24.

The mean reading of the *Barometer* for the month was 29in·829, being 0in·109 *higher* than the average for the 20 years, 1854–1873.

Temperature of the Air.

The highest in the month was 63°·0 on October 1; the lowest in the month was 26°·2 on October 17; and the range was 36°·8.
The mean of all the highest daily readings in the month was 52°·4, being 5°·8 *lower* than the average for the 40 years, 1841–1880.
The mean of all the lowest daily readings in the month was 39°·0, being 4°·6 *lower* than the average for the 40 years, 1841–1880.
The mean daily range was 13°·4, being 1°·2 *less* than the average for the 40 years, 1841–1880.
The mean for the month was 45°·4, being 5°·7 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1881.	WIND AS DEDUCED FROM SELF-REGISTERING ANEMOMETERS.						CLOUDS AND WEATHER.	
	OSLER'S.					ROBINSON'S.		
	General Direction.		Pressure on the Square Foot.			Horizontal Movement of the Air.		
	A.M.	P.M.	Greatest.	Least.	Mean of 24 Hourly Measures.		A.M.	P.M.
			lbs.	lbs.	lbs.	miles.		
Oct. 1	Calm : ENE	ENE : NE	2·0	0·0	0·1	226	0, f : 0, tk.-f : 1, ci.-cu	1, ci.-cu : 0 : 0, hy.-d
2	NE : ENE	ENE : NE	1·8	0·0	0·1	278	0, d : 0 : 3, ci.-cu, ci	6, ci.-cu, cu.-s : v, cu.-s, ci.-s, s
3	NE : ENE	E : ENE	2·9	0·0	0·3	248	p.-cl : v, li.-ci, ci.-cu	7, cu, cu.-s : 1, ci.-cu : v
4	ENE : E	NE : NNE	5·6	0·0	0·6	309	10 : 8, cu.-s, cu, ci.-cu, li.-shs	5, ci.-cu, cu.-s, cu : v, ci.-cu, cu.-s, d
5	N : NNE	NE : E : WSW	1·3	0·0	0·0	178	p.-cl : 8, ci.-cu, cu.-s	8, cu.-s, ci.-cu, se : 0, m, ho.-fr, slt.-f
6	W : NW	N	4·8	0·0	0·3	303	m : 10, glm, slt.-f, th.-r	10, th.-r : 10 : 1, li.-cl
7	N	N	0·8	0·0	0·0	192	10, th.-cl : v, ci.-s, cu.-s, ci	10 : 10, slt.-f
8	SW : NE	NNE : NE	2·6	0·0	0·3	235	10, slt.-f, r : 10, r, gt.-glm	10, fq.-r : 10, se, fq.-r
9	N : NW : WSW	WSW : W	2·0	0·0	0·1	255	10, se : 10, slt.-f	10 : v, slt.-r
10	WSW	SW	2·7	0·0	0·3	341	0, h, d : 10, th.-cl, so.-ha	9, li.-cl, cu.-s, ci : 10,th.-cl,cu.-s,lu.-ha,slt.-r
11	SW	WSW	4·5	0·0	0·9	451	10, slt.-r : 8, cu.-s, li.-cl	10,cu.-s,ci.-cu,sh.-r: p.-cl : 0
12	WSW	WSW	5·3	0·0	0·8	420	v : 9, li.-cl, ci.-s	10, fq.-r : 10, li.-shs
13	WSW : W	WSW : SW : S	4·2	0·0	0·4	359	10 : 7, ci, ci.-cu, so.-ha	9, cu, ci, ci.-cu, cu.-s: 10, hy.-r
14	SW : WSW	WSW : WNW : W	53·0	0·3	10·1	999	10, w : 10,se,hy.-sh,st.-w: 8,ci,cu.-s,se,hy.-g	7, cu.-s, ci.-cu, hy.-g: 2, ci.-cu, li.-cl, w
15	WSW : W : WNW	WNW	14·0	0·0	1·1	454	0 : 2, li.-cl, ci.-cu	4,cu.-s,cu,ci.-cu,glm,slt.-r: 0
16	WSW : NW	NNW : S	0·0	0·0	0·0	147	0 : 0, m, slt.-f, ho.-fr	6,li.-cl,slt.-f: 0, h, f : 0,slt.-f,ho.-fr
17	SE : E : SSW	S : SE	0·0	0·0	0·0	102	0, ho.-fr : 2, ci, h, ho.-fr, slt.-f	3,ci.-cu,ci,ci.-s,so.-ha: 0, ho.-fr, f
18	ESE : SE	ESE	1·8	0·0	0·2	210	0, ho.-fr, slt.-f : 0, ho.-fr	1, ci : 2, th.-cl
19	ESE	E	6·0	0·0	0·7	320	0 : 1, ci.-cu	3, ci.-cu, cu : v, li.-cl, m
20	ESE : E	E	16·2	0·0	2·1	492	v : 6, cu.-s, ci.-cu, w	2,ci.-cu,ci,w: 0 : 9
21	ENE : E	ENE : E	2·0	0·0	0·1	220	10, r : 10, r	10, m.-r : 10
22	ESE	ESE	8·0	0·0	1·1	381	10, slt.-r : 10, r	10, fq.-r : 10, fq.-r : 10
23	ESE : E	E : ENE	1·0	0·0	0·0	230	10, hy.-r : 10, c.-hy.-r	10 : 10, m.-r
24	ENE : E	ENE	2·0	0·0	0·2	312	10 : 10, oc.-m.-r	10, oc.-m.-r : 10
25	NE	NNE : N	3·4	0·0	0·5	371	10 : 7, cu.-s, ci.-cu, slt.-r	v,cu.-s,ci.-cu,cu,slt.-sh: 5, cu.-s
26	N : NE	NE	2·0	0·0	0·2	283	0 : 2, th.-cl, ci.-s	8,n,cu.-s,ci.-cu,slt.-r: v, slt.-r
27	NE	NNE	1·5	0·0	0·1	245	p.-cl : 9, cu.-s	10, slt.-r : 10, slt.-r
28	N	N	1·4	0·0	0·1	220	p.-cl : 8, cu.-s	3,ci.-cu,ci,slt.-h: 10 : 10
29	N	NNE : N	4·2	0·0	0·5	313	10 : 10, sl	6, n, cu, ci.-cu : 0, ho.-fr
30	NNW : N	NNE : NE	4·0	0·0	0·3	289	0, ho.-fr : 0, h	6, cu.-s, ci.-cu : ho.-fr
31	Variable : Calm	SE	0·0	0·0	0·0	107	0, ho.-fr : 0, f, ho.-fr	4, ci.-cu, cu.-s : v, th.-cl,ho.-fr,lu.-ha
Means	...	...	..	..	0·7	306		
Number of Column for Reference.	21	22	23	24	25	26	27	28

The mean *Temperature of Evaporation* for the month was 43°·5, being 5°·4 *lower* than
The mean *Temperature of the Dew Point* for the month was 41°·4, being 5°·4 *lower* than
The mean *Degree of Humidity* for the month was 86·6, being 0·5 *greater* than
The mean *Elastic Force of Vapour* for the month was 0^{in}·261, being 0^{in}·060 *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 3^{grs}·0, being 0^{gr}·6 *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 547 grains, being 8 grains *greater* than
} the average for the 20 years, 1849-1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 6·1.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·29. The maximum daily amount of *Sunshine* was 9·3 hours on October 2.

The highest reading of the *Solar Radiation Thermometer* was 125°·0 on October 3; and the lowest reading of the *Terrestrial Radiation Thermometer* was 19°·6 on October 31.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 1·0; for the 6 hours ending 3 p.m., 0·2; and for the 6 hours ending 9 p.m., 0·4.

The *Proportions of Wind* referred to the cardinal points were N. 10, E. 10, S. 4, and W. 6. One day was calm.

The *Greatest Pressure of the Wind* in the month was 53^{lbs}·0 on the square foot on October 14. The mean daily *Horizontal Movement of the Air* for the month was 306 miles; the greatest daily value was 999 miles on October 14; and the least daily value 102 miles on October 17.

Rain fell on 13 days in the month, amounting to 2^{in}·711, as measured by gauge No. 6 partly sunk below the ground; being 0^{in}·227 *less* than the average fall for the 40 years, 1841-1880.

MONTH and DAY. 1881.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Of the Air. Lowest.	Of the Air. Daily Range.	Of the Air. Mean of 24 Hourly Values.	Of the Air. Excess of Mean above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Greatest of 24 Hourly Values.	Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	hours	hours	in.		
Nov. 1	..	29·699	38·8	30·1	8·7	35·2	−11·8	33·5	30·8	4·4	7·4	0·5	84	49·3	22·1	0·0	9·6	0·041	2·2	mP : mN, mP
2	In Equator	29·646	42·1	33·0	9·1	37·9	− 8·8	36·2	33·9	4·0	6·4	0·8	86	71·8	29·0	0·8	9·5	0·000	0·0	sP
3	..	29·630	53·1	36·1	17·0	43·9	− 2·5	43·5	43·0	0·9	4·3	0·0	97	59·4	35·7	0·0	9·5	0·083	0·0	mP, wN : wP
4	..	29·758	61·1	49·4	11·7	56·2	+10·2	55·6	55·1	1·1	4·0	0·0	96	82·0	40·6	0·0	9·4	0·068	0·0	wP
5	..	29·830	63·3	53·8	9·5	57·5	+11·9	55·1	52·9	4·6	11·2	1·3	85	82·1	43·8	0·7	9·4	0·000	0·0	wP
6	Full	29·992	56·1	42·3	13·8	51·9	+ 6·7	51·1	50·3	1·6	6·4	0·0	94	70·9	32·6	0·9	9·3	0·187	0·0	wP : mP
7	..	30·036	55·9	44·0	11·9	49·6	+ 4·9	49·2	48·8	0·8	3·6	0·0	97	75·0	35·0	0·1	9·2	0·006	0·0	wP
8	Greatest Declination N	30·023	53·1	49·7	3·4	51·4	+ 7·1	51·3	51·2	0·2	1·4	0·0	99	61·0	48·0	0·0	9·2	0·000	0·0	wP
9	..	29·908	54·0	43·0	11·0	47·0	+ 3·2	46·1	45·1	1·9	5·6	0·0	94	73·9	35·0	3·6	9·1	0·000	0·0	wP : mP
10	..	29·900	58·4	42·0	16·4	53·6	+10·2	51·7	49·9	3·7	7·0	0·9	87	66·2	32·9	0·0	9·1	0·000	0·5	wP
11	..	30·061	57·4	49·9	7·5	53·7	+10·7	52·1	50·5	3·2	5·7	1·4	89	67·0	45·5	0·0	9·0	0·000	2·0	wP : mP : wP
12	..	29·995	59·5	51·9	7·6	54·4	+11·8	52·4	50·4	4·0	9·3	0·6	86	86·6	47·8	5·6	9·0	0·047	2·0	wP
13	Apogee Last Quarter.	30·208	60·9	49·5	11·4	53·4	+11·1	51·5	49·6	3·8	7·2	1·2	87	88·8	45·2	3·6	8·9	0·000	1·5	wP
14	..	30·180	53·3	46·8	6·5	50·9	+ 8·9	50·3	49·7	1·2	2·4	0·0	96	59·3	44·0	0·0	8·9	0·000	0·8	wP
15	..	29·887	54·1	44·1	10·0	49·5	+ 7·7	47·7	45·8	3·7	7·6	1·0	88	83·2	38·5	2·4	8·8	0·000	6·2	wP
16	In Equator	29·780	55·1	44·0	11·1	50·7	+ 9·1	48·3	45·8	4·9	8·4	1·2	84	77·4	38·1	2·1	8·8	0·173	3·8	wP : wP, wN
17	..	29·636	55·3	42·9	12·4	50·5	+ 9·0	47·5	44·4	6·1	10·8	1·8	80	82·9	36·5	4·9	8·7	0·000	5·2	wP : vP : sP
18	..	30·109	49·9	34·0	15·9	43·6	+ 2·1	42·3	40·7	2·9	8·2	0·0	90	69·9	27·0	3·7	8·7	0·008	1·3	vP
19	..	30·028	53·1	43·0	10·1	48·1	+ 6·7	46·1	43·9	4·2	8·2	2·1	86	91·2	35·1	3·6	8·6	0·000	5·0	wP : mP
20	..	29·831	57·3	43·3	14·0	51·3	+10·0	49·5	47·7	3·6	8·4	1·6	88	84·0	35·2	2·4	8·6	0·000	6·0	wP
21	New	29·525	54·2	48·5	5·7	51·7	+10·5	48·8	45·9	5·8	10·2	3·8	81	84·7	41·7	2·6	8·5	0·140	15·0	wP, wN : mP
22	Greatest Declination S.	29·625	58·3	42·0	16·3	51·6	+10·5	48·6	45·6	6·0	11·8	1·6	80	67·8	33·5	0·1	8·5	0·030	7·0	wP : mP : sP
23	..	29·770	54·1	41·0	13·1	48·5	+ 7·5	46·3	43·9	4·6	10·8	0·6	85	82·0	34·4	3·4	8·4	0·012	2·2	vP, wN : sP
24	..	29·852	52·5	41·1	11·4	49·0	+ 8·0	47·0	44·8	4·2	6·2	1·7	86	62·0	34·0	0·0	8·4	0·030	15·8	mP : wP
25	Perigee	29·537	53·2	44·2	9·0	50·6	+ 9·7	49·8	49·0	1·6	3·4	0·2	94	54·5	40·0	0·0	8·3	0·658	14·2	wP, wN : wN : mP
26	..	29·263	54·7	41·0	13·7	47·2	+ 6·4	45·5	43·6	3·0	9·2	1·0	88	93·5	35·5	3·5	8·3	0·202	4·0	vP : wP
27	..	28·845	55·0	41·6	13·4	48·4	+ 7·6	45·1	41·5	6·9	11·1	1·8	77	74·1	37·9	3·0	8·2	0·515	12·8	—: wP, wN: vP, vN
28	First Qr.	29·173	53·2	41·5	11·7	48·0	+ 7·1	45·1	41·9	6·1	9·2	3·5	80	92·6	34·5	3·5	8·2	0·061	6·8	wP, wN : wP : mP
29	In Equator	29·803	47·1	35·5	11·6	41·5	+ 0·5	40·6	39·5	2·0	5·5	0·0	93	72·2	26·9	4·5	8·2	0·000	0·5	mP : sP : sP
30	..	29·919	46·9	36·0	10·9	44·0	+ 2·8	42·8	41·4	2·6	4·0	0·0	90	56·3	27·5	0·2	8·1	0·002	4·2	mP
Means	..	29·782	54·0	42·8	11·2	49·0	+ 6·3	47·4	45·6	3·5	7·2	1·0	88·2	74·1	36·4	1·8	8·8	Sum 2·265	4·0	..
Number of Column for Reference	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, and 15 are derived from eye-readings of self-registering thermometers.

The mean reading of the *Barometer* for the month was 29in·782, being 0in·011 *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 63°·3 on November 5; the lowest in the month was 30°·1 on November 1; and the range was 33°·2.

The mean of all the highest daily readings in the month was 54°·0, being 5°·3 *higher* than the average for the 40 years, 1841–1880.

The mean of all the lowest daily readings in the month was 42°·8, being 5°·6 *higher* than the average for the 40 years, 1841–1880.

The mean daily range was 11°·2, being 0°·3 *less* than the average for the 40 years, 1841–1880.

The mean for the month was 49°·0, being 6°·3 *higher* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1881.	WIND AS DEDUCED FROM SELF-REGISTERING ANEMOMETERS. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	CLOUDS AND WEATHER. A.M.	P.M.
			lbs.	lbs.	lbs.	miles.		
Nov. 1	ESE : SE	SSE : ESE	2·2	0·0	0·1	197	10 : 10, slt.-sn	10, sn, r : 10 : v, ci.-s, s
2	E : ESE	ESE	2·6	0·0	0·2	246	p.-cl, ci.-s, s : 9, ci.-s, so.-ha	8,ci.-s,cu-s,ci.-cu,h,so.-ha: 10
3	E : ESE : SE	SE : SW	0·0	0·0	0·0	189	10 : 10, r, m	10, fq.-r : 10, sc, f
4	S : SW	SSW : S	2·6	0·0	0·3	309	10, hy.-sh : 10	10 : 10, sh.-r
5	S : SSW	SSW : SW	5·8	0·0	0·5	350	10 : 8, ci.-cu	9, cu.-s, ci.-cu, ci : 10
6	SSW : WNW	W : SW	0·0	0·0	0·0	146	10, r : 10, r, slt.-f	5, ci.-s : 0, slt.-f : p.-cl, cu.-s, s, slt.-f
7	Calm : NE	E : Calm	0·3	0·0	0·0	115	10, slt.-f : 10, oc.-r	9, ci.-s : 10, oc.-r, f
8	Calm : E	E : ESE	0·0	0·0	0·0	126	10, f : 10, slt-f, m.-r	10, m.-r : 10
9	E	E : ESE	0·0	0·0	0·0	109	10 : 4, ci, m	6, ci, ci.-s : 6, li.-cl, ci.-s, lu.-ha
10	SW : WSW	WSW	2·2	0·0	0·4	344	10 : 10, sc, m.-r	10 : 10, cu.-s
11	SW	SSW	1·2	0·0	0·1	291	10 : 10	10 10, m.-r : 10
12	SSW : SW : WSW	WSW : SW	3·8	0·0	0·6	433	10 : 1, hy.-sh	7, cu, ci, ci.-s : vv
13	WSW	SW	2·3	0·0	0·2	354	10 : 5, ci.-cu, ci.-s, ci	6,cu.-s,ci.-cu,ci: 1 : 10
14	SW	SW : S	1·4	0·0	0·0	248	10 : 10	10 : 10
15	SSW	SSW : WSW	2·5	0·0	0·4	389	10 : 10	7, ci.-cu, cu.-s : 1, li.-cl
16	SW : SSW	SSW	12·5	0·0	2·4	627	0 : 4, ci, ci.-cu, w	10, w : 10, st.-w, r
17	SW : WSW	WSW	9·9	0·0	2·1	575	p.-cl, w : 0, w	5,cu.-s,cu,ci.-cu,slt.-sh : 0, d
18	WSW : Calm	SSE	0·1	0·0	0·0	153	0 . 0, tk.-f : 0, f, ho.-fr	v, ci : 10 : 10, oc.-r
19	S : SSW	SSW : S	2·8	0·0	0·3	311	10 : 7, cu.-s, ci, sc	3, ci, ci.-cu : 0 : 0, d
20	SSW : SW	SW : SSW	4·0	0·0	0·2	343	0, d : 9	4, cu.-s, cu : 0 : v,cu.-s,slt.-r
21	SSW : SW	SW : SSW	20·0	0·0	2·6	643	p.-cl, w : 10, sc, r, st.-w	5, cu.-s, cu, ci.-cu : 10, oc.-slt.-r
22	SW : WSW	SW : S	14·0	0·0	1·6	530	10, slt.-r, w : 10, ci.-s, so.-ha, w	9,ci.-cu,cu.-s,ci.-s: 0 : 0, d
23	S : SW	SW : SSW	4·7	0·0	0·5	358	0, d : 10, slt.-r	4,ci,ci.-cu,cu : vv, slt.-r : 0, d
24	S : SSW	SSW	7·0	0·0	1·3	484	v : 10, s, ci.-s, sc	10 : 10, r
25	S	S : SW	5·2	0·0	0·9	423	10, r : 10, sc, c.-r	10, c.-r : 10
26	SW : SSW	S : SSW	35·0	0·0	4·0	643	p.-cl : 1, s, ci.-s, ci	9,cu.-s,ci.-cu,sc,so.-ha,r,st.-w: 10, g, r
27	WSW : SW	SW : SSW	37·5	0·0	5·0	815	10, hy.-r, g : v, r, hy.-sqs	vv, ci.-s, shs.-r, w : v, hy.-sh, sqs, l
28	SSW : SW	SW	34·0	0·0	2·3	541	p.-cl, hy.-sqs, r : 5, ci.-s, ci, s, cu.-s	6, cu.-s, cu, ci.-cu : 0, hy.-d
29	SW	SW : S	0·0	0·0	0·0	216	0, hy.-d : 0, ho.-fr, m	1, th.-cl, m, h: 0, hy.-d : 0,ho.-fr,slt.-f
30	SSE	SSE	2·1	0·0	0·4	324	slt.-f : 9	10, sc : 10
Means	...	...	..	..	0·9	361		
Number of Column for Reference.	21	22	23	24	25	26	27	28

The mean *Temperature of Evaporation* for the month was 47°·4, being 6°·2 *higher* than
The mean *Temperature of the Dew Point* for the month was 45°·6, being 6°·3 *higher* than
The mean *Degree of Humidity* for the month was 88·2, being 0·9 *greater* than
The mean *Elastic Force of Vapour* for the month was $0^{in}\cdot306$, being $0^{in}\cdot066$ *greater* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was $3^{grs}\cdot5$, being $0^{gr}\cdot7$ *greater* than
The mean *Weight of a Cubic Foot of Air* for the month was 542 grains, being 7 grains *less* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 7·4.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·20. The maximum daily amount of *Sunshine* was 5·6 hours on November 12.

The highest reading of the *Solar Radiation Thermometer* was 93°·5 on November 26; and the lowest reading of the *Terrestrial Radiation Thermometer* was 22°·1 on November 1.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 2·9; for the 6 hours ending 3 p.m., 0·4; and for the 6 hours ending 9 p.m., 0·7.

The *Proportions of Wind* referred to the cardinal points were N. 0, E. 4, S. 16, and W. 9. One day was calm.

The *Greatest Pressure of the Wind* in the month was $37^{lbs}\cdot5$ on the square foot on November 27. The mean daily *Horizontal Movement of the Air* for the month was 361 miles; the greatest daily value was 815 miles on November 27; and the least daily value 109 miles on November 9.

Rain fell on 16 days in the month, amounting to $2^{in}\cdot265$, as measured by gauge No. 6 partly sunk below the ground; being $0^{in}\cdot037$ *greater* than the average fall for the 40 years, 1841–1880.

MONTH and DAY, 1881.	Phases of the Moon.	Barometer. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	Temperature of the Air. Highest.	Temperature of the Air. Lowest.	Temperature of the Air. Daily Range.	Temperature of the Air. Mean of 24 Hourly Values.	Temperature of the Air. Excess of Mean above Average of 20 Years.	Temperature of Evaporation. Mean of 24 Hourly Values.	Temperature of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Difference. Greatest of 24 Hourly Values.	Difference. Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	Temperature. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Temperature. Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	hours.	hours.	in.		
Dec. 1	..	29·859	46·7	37·3	9·4	44·4	+ 2·9	43·3	42·0	2·4	4·0	1·0	92	49·2	30·8	0·0	8·1	0·175	5·2	wP, vN : vP, wN
2	..	30·079	53·7	36·0	17·7	47·1	+ 5·3	45·3	43·3	3·8	6·2	1·8	88	90·1	29·7	3·3	8·1	0·000	1·5	mP
3	..	30·031	48·5	35·2	12·3	43·8	+ 1·7	42·2	40·3	3·5	7·4	0·2	87	93·8	28·0	5·2	8·0	0·000	5·0	wP : mP : sP
4	..	30·070	43·8	36·1	7·7	41·3	− 1·1	39·8	37·9	3·4	6·4	0·7	89	50·0	27·2	0·0	8·0	0·000	4·5	mP : mP : wP, wN
5	Full	30·009	48·6	39·2	9·4	45·4	+ 2·8	44·7	43·9	1·5	3·4	0·7	95	51·9	31·0	0·0	8·0	0·183	3·0	wP : mP
6	Greatest Declination N	29·964	50·4	35·2	15·2	44·1	+ 1·4	43·0	41·7	2·4	6·9	0·0	91	76·8	27·0	0·8	8·0	0·020	6·5	mP : wP
7	..	29·671	50·2	37·2	13·0	44·5	+ 1·7	43·3	41·9	2·6	6·3	0·7	91	65·6	30·5	1·1	7·9	0·327	3·5	wP, wN : mP : sP
8	..	29·730	43·6	34·0	9·6	38·3	− 4·5	37·0	35·2	3·1	6·8	1·0	89	81·8	27·3	2·9	7·9	0·000	0·0	sP : ssP
9	..	29·447	39·1	35·6	3·5	37·6	− 5·2	37·3	36·9	0·7	2·4	0·0	97	42·6	27·8	0·0	7·9	0·207	0·0	mP, mN : vP, wN
10	..	29·436	36·2	31·2	5·0	33·7	− 9·0	33·5	33·2	0·5	1·6	0·0	98	38·4	29·4	0·0	7·9	0·160	0·0	vP, mN
11	Apogee	29·522	36·6	30·7	5·9	34·5	− 8·0	33·9	33·0	1·5	3·1	0·8	94	45·3	26·7	0·0	7·8	0·041	0·0	mP, wN : vP, wN
12	..	29·694	38·9	34·2	4·7	37·0	− 5·2	36·3	35·3	1·7	2·8	0·2	94	40·9	30·0	0·0	7·8	0·105	0·0	wP, wN : vN, mP
13	In Equator Last Quarter	30·104	38·9	30·5	8·4	34·7	− 7·1	34·1	33·1	1·6	4·1	0·0	94	62·8	22·5	0·2	7·8	0·000	0·0	mP : vP
14	..	30·087	43·3	30·3	13·0	37·5	− 4·0	36·4	34·9	2·6	6·6	0·0	91	75·0	25·5	3·8	7·8	0·000	1·5	mP : vP, mN
15	..	29·875	42·1	36·7	5·4	39·5	− 1·6	38·5	37·2	2·3	4·8	0·7	92	46·2	35·0	0·0	7·8	0·122	4·5	wN, wP : vP, mN
16	..	29·579	43·4	37·7	5·7	40·9	+ 0·1	39·9	38·7	2·2	3·7	0·7	92	47·1	34·2	0·0	7·8	0·067	2·0	wP : wP, wN
17	..	29·070	52·1	41·0	11·1	45·9	+ 5·4	44·1	42·0	3·9	9·2	2·0	86	75·5	36·6	1·2	7·7	0·374	11·2	wN, wP
18	..	29·084	53·4	37·4	16·0	42·0	+ 1·8	39·3	36·0	6·0	12·8	1·0	80	71·6	31·0	5·2	7·7	0·258	7·2	wN, wP : sP
19	..	29·365	44·0	36·0	8·0	40·0	0·0	37·8	34·9	5·1	10·1	2·3	82	79·5	29·1	5·2	7·7	0·020	6·0	mP : vP
20	Greatest Declination S	28·907	44·1	37·9	6·2	41·8	+ 2·0	39·3	36·2	5·6	12·3	1·1	82	82·6	31·4	3·0	7·7	0·412	1·5	wP, wN : vP, vN
21	New	29·450	43·5	33·3	10·2	39·5	− 0·1	36·5	32·6	6·9	9·5	4·8	77	62·3	25·8	3·9	7·7	0·000	0·0	mP, wN : sP
22	..	29·791	38·0	29·7	8·3	33·2	− 6·2	32·3	30·6	2·6	5·1	0·0	90	46·8	23·4	0·0	7·7	0·000	0·0	sP
23	Perigee	30·231	33·6	26·0	7·6	30·9	− 8·4	30·7	30·2	0·7	4·1	0·0	98	39·4	19·8	0·0	7·7	0·000	0·0	mP
24	..	30·348	38·5	21·6	16·9	30·4	− 8·9	29·9	28·6	1·8	4·2	0·0	92	49·8	19·5	0·0	7·7	0·000	0·0	mP
25	..	30·338	43·8	27·5	16·3	35·5	− 3·7	34·3	32·4	3·1	5·7	0·0	89	43·8	17·2	0·0	7·7	0·000	0·0	mP
26	In Equator	30·398	45·4	43·3	2·1	44·2	+ 5·1	43·6	42·9	1·3	2·0	0·0	95	47·0	38·6	0·0	7·8	0·018	2·3	wP
27	First Qr.	30·429	45·5	40·6	4·9	42·8	+ 3·8	42·4	41·9	0·9	2·4	0·4	97	48·1	39·5	0·0	7·8	0·000	0·7	wP
28	..	30·282	42·6	37·3	5·3	39·8	+ 1·0	39·5	39·1	0·7	2·2	0·0	98	42·9	36·1	0·0	7·8	0·000	0·0	wP : mP
29	..	30·052	45·8	39·1	6·7	42·7	+ 4·0	41·7	40·5	2·2	5·3	0·0	92	48·3	32·2	0·0	7·8	0·000	1·0	wP
30	..	29·821	44·4	35·5	8·9	41·2	+ 2·7	40·1	38·7	2·5	5·1	0·7	91	57·0	28·8	0·3	7·8	0·000	0·0	wP
31	..	29·720	44·2	37·8	6·4	41·7	+ 3·4	40·5	39·0	2·7	5·3	0·9	91	47·0	29·6	0·0	7·8	0·000	1·3	wP
Means	..	29·821	44·0	34·9	9·1	39·9	− 0·9	38·7	37·2	2·6	5·5	0·7	90·8	58·0	29·1	1·2	7·8	Sum 2·495	2·2	..
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, and 15 are derived from eye-readings of self-registering thermometers.

The mean reading of the *Barometer* for the month was 29^in·821, being 0^in·030 *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 53°·7 on December 2; the lowest in the month was 21°·6 on December 24; and the range was 32°·1.
The mean of all the highest daily readings in the month was 44°·0, being 0°·4 *lower* than the average for the 40 years, 1841–1880.
The mean of all the lowest daily readings in the month was 34°·9, being 0°·1 *lower* than the average for the 40 years, 1841–1880.
The mean daily range was 9°·1, being 0°·3 *less* than the average for the 40 years, 1841–1880.
The mean for the month was 39°·9, being 0°·9 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1881.	WIND AS DEDUCED FROM SELF-REGISTERING ANEMOMETERS. OSLER'S. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	ROBINSON'S. Horizontal Movement of the Air.	CLOUDS AND WEATHER. A.M.	P.M.
			lbs.	lbs.	lbs.	miles.		
Dec. 1	SE	WSW : W	3·0	0·0	0·1	285	10 : 10, r	10, slt.-r : p.-cl, r : 0, d
2	SW	SSW	1·6	0·0	0·2	323	0, d : 4, ci.-cu	6, ci.-cu, cu.-s : 6, ci.-cu, li.-cl, slt.-r
3	S : SSE	SSE	1·3	0·0	0·1	264	p.-cl : 1, li.-cl, ci	3, ci, ci.-cu : 2, li.-cl, lu.-ha
4	SSE : S	SSW : S	0·6	0·0	0·0	245	10 : 10	10 : 10, sc, oc.-th.-r
5	S	SSW : WNW : WSW	1·8	0·0	0·1	276	10, sc : 10, r	9, sc, r : 0, m : 0, hy.-d
6	SW : S	SSW	7·8	0·0	1·1	402	li.-cl : 6,th.-cl,ci.-s,s,ho.-fr,so.-ha	9, s, ci, sc, so.-ha : 10, sc, th.-r, w
7	SSW : NW : WSW	WSW : SW	4·0	0·0	0·4	320	10, hy.-r : 10	5,ci.-s,cu.-s,ci: 0 : 0, d
8	WSW : SW	SW : S	0·5	0·0	0·0	229	0, d : 4, ci.-cu, ho.-fr	5,ci,ci.-s,ci.-cu: 0 :8,ci.-cu,ho.-fr,d,slt.-f
9	SE : S	SE : S : N	0·0	0·0	0·0	63	10 : 10, hy.-r, f, glm	10, r, gt.-glm : 10, slt.-f : v, li.-cl
10	NE : NNE	NNE : N	0·1	0·0	0·0	212	10 : 10, sn	10, sn, th.-r, glm : 10
11	N : WSW : W	W : WSW	0·1	0·0	0·0	227	10 : 0, m, slt.-f, ho.-fr	9, slt.-f, slt.-r : 10, slt.-r
12	NNW : NW	NNW : ENE	0·6	0·0	0·0	193	10 : 10, r, slt.-m	10, fq.-th.-r, glm : 10, m
13	ESE : ENE	NE : Calm : SW	0·3	0·0	0·0	114	0, m, ho.-fr : 1, ci, ho.-fr, tk.-f	6, ci.-cu, ci.-s, f : 10, tk.-f, ho.-fr
14	SW : SSE	SSW	1·0	0·0	0·0	195	10, f : 4, cu.-s, slt.-f, ho.-fr	5, ci.-cu, ci, cu.-s : 10, slt.-r
15	SSW : SSE	SSE	2·0	0·0	0·1	250	10, r : 10, slt.-r	10, sc, slt.-r : 10, li.-shs
16	SSE : SSW : S	S : SSE	5·3	0·0	0·7	319	10, li.-shs : 10, li.-shs	10, sc, fq.-th.-r : 10, r, w
17	SSW : SW	SW : WSW	21·0	0·0	3·4	668	10 : 10, oc.-r, w	10, sc, fq.-r, st.-w : 10, w, r
18	SW : NW : WSW	WSW	..	..	..	759	10, hy.-r, hy.-sqs : 1, th.-cl, st.-w	2, ci.-cu, w : 0
19	SW : WSW	WSW : SW : S	2·9	0·0	0·5	424	0 : 0, ho.-fr	2, ci.-cu, ci.-s, so.-ha, li.-shs : v, cu.-s, m
20	SSE : WSW	WSW	15·8	0·0	4·1	736	th.-cl : hy.-r, l, t : 1, li.-sc, w	3, li.-sc, ci, st.-w : 10, oc.-r, st.-w
21	WNW : W : WSW	W : WSW	18·0	0·0	2·3	526	10, st.-w : 5, ci	3, th.-cl : 0, slt.-f
22	SW : Calm : NE	NE : N	0·1	0·0	0·0	159	0, m, ho.-fr : 10, slt.-f, ho.-fr	9, ci.-s, ci, s, slt.-f : 0, ho.-fr, slt.-f
23	N : NNW	SW : SE : Calm	0·2	0·0	0·0	102	0, f, ho.-fr : 0, h, slt.-f, ho.-fr	0, f, h, ho.-fr : 0, f, ho.-fr
24	Calm : E : SE	SSE	0·3	0·0	0·0	138	0, tk.-f, ho.-fr : 10, f, ho.-fr	10, ci.-cu, ci.-s, cu.-s : 0, ho.-fr, m
25	SSE : SSW	SSW : SW	2·2	0·0	0·1	279	m, ho.-fr : 10	10 : 10
26	SW	WSW	1·5	0·0	0·1	295	10 : 10, slt.-r	10, oc.-m.-r : 10
27	WSW	WSW : SW	2·2	0·0	0·0	285	10 : 10	10 : 10
28	SW : WSW	WSW : SW	0·3	0·0	0·0	200	10 : 10, m, m.-r	10, oc.-m.-r : v, oc.-m.-r
29	SSW	SSW	0·9	0·0	0·0	296	0 : 10	10 : 0 : 10, sc
30	SSW : SW	SW : SSW	1·8	0·0	0·0	276	10 : 10, s	8, ci, ci.-cu : li.-cl, lu.-co : p.-cl, ho.-fr
31	SSE : SSW	SSE : S	0·3	0·0	0·0	158	10 : 10	10 : 10 : p.-cl, sc
Means	...	...	..	..	0·4 (30 days)	297		
Number of Column for Reference.	21	22	23	24	25	26	27	28

The mean *Temperature of Evaporation* for the month was 38°·7, being 0°·6 *lower* than
The mean *Temperature of the Dew Point* for the month was 37°·2, being 0·2 *lower* than
The mean *Degree of Humidity* for the month was 90·8, being 3·0 *greater* than
The mean *Elastic Force of Vapour* for the month was $0^{in}\cdot222$, being $0^{in}\cdot002$ *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was $2^{grs}\cdot6$, being *the same as*
The mean *Weight of a Cubic Foot of Air* for the month was 553 grains, being 2 grains *greater* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 7·1.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·15. The maximum daily amount of *Sunshine* was 5·2 hours on December 3, 18, and 19.

The highest reading of the *Solar Radiation Thermometer* was 93°·8 on December 3; and the lowest reading of the *Terrestrial Radiation Thermometer* was 17°·2 on December 25.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 1·4; for the 6 hours ending 3 p.m., 0·2; and for the 6 hours ending 9 p.m., 0·6.

The *Proportions of Wind* referred to the cardinal points were N. 3, E. 3, S. 15, and W. 10.

The *Greatest Pressure of the Wind* in the month was $21^{lbs}\cdot0$ on the square foot on December 17. The mean daily *Horizontal Movement of the Air* for the month was 297 miles; the greatest daily value was 759 miles on December 18; and the least daily value 63 miles on December 9.

Rain fell on 15 days in the month, amounting to $2^{in}\cdot495$, as measured by gauge No. 6 partly sunk below the ground; being $0^{in}\cdot706$ *greater* than the average fall for the 40 years, 1841–1880.

HIGHEST and LOWEST READINGS of the BAROMETER, reduced to 32° Fahrenheit, as extracted from the PHOTOGRAPHIC RECORDS.

MAXIMA.			MINIMA.			MAXIMA.			MINIMA.		
Approximate Greenwich Mean Solar Time, 1881.		Reading.	Approximate Greenwich Mean Solar Time, 1881.		Reading.	Approximate Greenwich Mean Solar Time, 1881.		Reading.	Approximate Greenwich Mean Solar Time, 1881.		Reading.
	d h m	in.		d h m	in.		d h m	in.		d h m	in.
January	2. 11. 0	30·260	January	4. 16. 20	30·060	April	28. 8. 20	30·095	April	30. 7. 45	29·469
	7. 8. 15	30·437		11. 18. 50	29·303	May	0. 19. 40	29·534	May	1. 18. 20	29·448
	13. 22. 25	29·700		15. 7. 45	29·561		3. 15. 15	29·934		4. 5. 30	29·830
	16. 12. 0	29·696		18. 5. 10	28·955		7. 19. 50	30·480		9. 5. 10	30·406
	21. 11. 20	30·143		22. 8. 30:	29·960		10. 10. 50	30·497		15. 16. 35	29·235
	23. 22. 10	30·133		27. 17. 15	28·850		16. 16. 35	29·870		18. 16. 30	29·423
	28. 4. 10	29·015		29. 3. 30	28·696		21. 20. 0	30·285		25. 15. 50	29·609
February	1. 10. 0	29·780	February	2. 2. 55	29·506		30. 19. 40	30·210	June	5. 15. 0	29·255
	2. 11. 10	29·585		4. 18. 10	29·209	June	9. 11. 40	30·069		11. 1. 30	29·836
	6. 14. 20	29·966		7. 18. 20	28·981		13. 10. 15	29·905		20. 16. 10	29·386
	8. 23. 10	29·595		10. 16. 0	28·745		23. 17. 20	30·091		25. 5. 10	29·835
	12. 10. 20	29·927		14. 5. 10	29·519		26. 0. 0	30·021		27. 4. 10	29·735
	21. 0. 0	30·099		22. 3. 30	29·954		29. 12. 10	30·155	July	1. 4. 15	29·794
	23. 21. 0	30·120		27. 22. 0:	29·569	July	3. 21. 50	30·070		5. 22. 0	29·519
March	2. 7. 45	30·154	March	4. 19. 40:	29·210		6. 23. 20	29·922		8. 5. 0	29·776
	5. 4. 20	29·284		5. 13. 25	29·065		10. 13. 0	30·071		11. 23. 45	29·875
	6. 6. 40	29·335		7. 4. 45	28·960		13. 20. 50	30·160		15. 6. 0	29·825
	8. 13. 40	29·815		8. 21. 5	29·712		16. 23. 0	29·939		19. 6. 0	29·624
	10. 9. 55	29·933		13. 17. 30	29·670		21. 11. 0	29·875		22. 7. 10	29·714
	17. 13. 0	30·375		21. 4. 30	29·502		22. 23. 15	29·825		25. 16. 55	29·358
	22. 8. 30	29·875		23. 15. 30	29·080		27. 20. 0	30·062		31. 5. 0	29·333
	26. 21. 30	29·800		29. 3. 30	29·531	August	3. 21. 0	30·164	August	5. 7. 20	29·770
	30. 10. 5	29·906	April	1. 4. 45	29·536		6. 10. 35	30·035		8. 13. 30	29·319
April	3. 9. 35	29·878		5. 16. 10	29·575		9. 9. 30	29·680		10. 2. 35	29·585
	7. 12. 50	29·929		11. 0. 35	29·657		10. 20. 15	29·866		12. 8. 35	29·430
	12. 9. 30	29·770		13. 17. 0	29·614		14. 9. 5	29·720		17. 13. 25	29·254
	16. 18. 40	29·855		18. 3. 45	29·750		18. 9. 55	29·632		19. 2. 55	29·296
	18. 22. 0	29·819		21. 16. 0:	29·580		20. 2. 15	29·780		21. 2. 30	29·550
	22. 22. 0	29·921		23. 14. 40	29·714		21. 21. 45	29·715		23. 13. 30:	29·360
	24. 8. 0	29·887		25. 3. 25	29·687		24. 12. 40	29·691		25. 16. 0	29·204
	26. 21. 10	29·996		27. 5. 50	29·922		28. 9. 50	29·991		29. 16. 45	29·396

HIGHEST and LOWEST READINGS of the BAROMETER, reduced to 32° Fahrenheit, as extracted from the PHOTOGRAPHIC RECORDS—*continued.*

MAXIMA.		MINIMA.		MAXIMA.		MINIMA.	
Approximate Greenwich Mean Solar Time, 1881.	Reading.	Approximate Greenwich Mean Solar Time, 1881.	Reading.	Approximate Greenwich Mean Solar Time, 1881.	Reading.	Approximate Greenwich Mean Solar Time, 1881.	Reading.
d h m	in.	d h m	in.	d h m	in.	d h m	in.
August 31. 10. 10	30·035	September 5. 16. 10	29·321	November 13. 8. 30	30·260	November 15. 2. 50	29·795
September 10. 0. 10	29·838	11. 3. 0	29·774	15. 13. 55	29·937	16. 15. 55	29·464
15. 20. 20	30·056	18. 3. 45:	29·454	18. 9. 10	30·183	20. 20. 20	29·346
19. 10. 10	29·748	20. 19. 0	29·274	21. 6. 30	29·621	21. 15. 40	29·395
23. 22. 0	30·023	24. 17. 35	29·850	22. 8. 30	29·815	22. 20. 40	29·668
28. 21. 40	30·241	October 2. 17. 0	29·961	23. 12. 10	29·952	25. 2. 40	29·404
October 3. 21. 5	30·051	4. 17. 10	29·967	25. 10. 45	29·487	26. 13. 5	28·714
6. 23. 25	30·330	9. 3. 0	29·615	29. 11. 5	29·980	December 0. 23. 0	29·775
9. 22. 10	29·886	11. 2. 10	29·555	December 1. 22. 45	30·105	3. 1. 0	30·014
11. 19. 15	29·693	12. 13. 50	29·566	3. 22. 40	30·089	5. 1. 40	29·934
12. 22. 25	29·695	13. 19. 40	28·875	5. 14. 0	30·105	6. 15. 10	29·573
16. 12. 0	30·246	22. 6. 15	29·118	7. 14. 40	29·799	9. 3. 0:	29·387
27. 10. 0	30·065	28. 17. 40	29·912	13. 8. 10	30·190	17. 3. 30	28·840
30. 9. 20	30·075	November 3. 3. 15	29·579	17. 9. 10	28·997	17. 16. 50	28·571
November 6. 11. 40	30·108	7. 7. 20	29·972	18. 22. 30	29·414	19. 18. 40	28·683
7. 21. 35	30·052	9. 12. 45	29·820	23. 11. 0	30·395	24. 13. 55	30·305
10. 20. 35	30·107	11. 16. 0	29·895	26. 22. 20	30·463		

The readings in the above table are accurate, but the times are occasionally liable to uncertainty, as the barometer will sometimes remain at its extreme reading without sensible change for a considerable interval of time. In such cases the time given is the middle of the stationary period, the symbol : denoting that the reading has been sensibly the same through a period of more than one hour. The reading at April 24^{d}. 8^{h}. 0^{m}. has been inferred, on account of partial loss of photographic register.

ABSOLUTE MAXIMA AND MINIMA READINGS OF THE BAROMETER for each Month in the YEAR 1881.
[Extracted from the preceding Table.]

1881. MONTH.	Readings of the Barometer.		Range of Reading in each Month.
	Maxima.	Minima.	
	in.	in.	in.
January	30·437	28·696	1·741
February	30·120	28·745	1·375
March	30·375	28·960	1·415
April	30·095	29·469	0·626
May	30·497	29·235	1·262
June	30·155	29·255	0·900
July	30·160	29·333	0·827
August	30·164	29·204	0·960
September	30·241	29·274	0·967
October	30·330	28·875	1·455
November	30·260	28·714	1·546
December	30·463	28·571	1·892

The highest reading in the year was 30in·497 on May 10. The lowest reading in the year was 28in·571 on December 18.
The range of reading in the year was 1in·926.

MONTHLY RESULTS OF METEOROLOGICAL ELEMENTS for the YEAR 1881.

1881, Month.	Mean Reading of the Barometer.	Temperature of the Air. Highest.	Lowest.	Range in the Month.	Mean of all the Highest.	Mean of all the Lowest.	Mean Daily Range.	Monthly Mean.	Excess of Mean above Average of 20 Years.	Mean Temperature of Evaporation.	Mean Temperature of the Dew Point.	Mean Degree of Humidity. (Saturation = 100.)
	in.	°	°	°	°	°	°	°	°	°	°	
January ..	29·712	50·0	12·7	37·3	36·2	27·3	8·9	31·7	− 7·1	30·6	28·0	86·3
February..	29·661	54·0	26·1	27·9	42·5	33·5	9·0	38·0	− 1·6	36·6	34·5	87·2
March	29·725	59·8	24·6	35·2	51·1	35·5	15·6	42·6	+ 1·0	40·2	37·1	81·1
April	29·774	66·1	29·3	36·8	55·6	37·5	18·1	45·8	− 1·7	42·4	38·5	76·1
May	29·925	78·3	30·9	47·4	65·8	43·6	22·2	54·0	+ 0·9	50·0	46·1	75·2
June	29·806	83·9	38·5	45·4	70·0	49·7	20·3	58·6	− 1·1	54·0	49·9	73·4
July	29·828	97·1	43·9	53·2	77·7	54·9	22·8	65·5	+ 2·9	59·7	55·1	70·2
August ...	29·673	85·4	43·1	42·3	69·7	51·6	18·2	59·2	− 2·6	55·9	53·0	80·3
September.	29·800	72·9	39·0	33·9	64·6	48·8	15·8	55·7	− 1·8	53·7	51·9	87·6
October ...	29·829	63·0	26·2	36·8	52·4	39·0	13·4	45·4	− 5·7	43·5	41·4	86·6
November .	29·782	63·3	30·1	33·2	54·0	42·8	11·2	49·0	+ 6·3	47·4	45·6	88·2
December .	29·821	53·7	21·6	32·1	44·0	34·9	9·1	39·9	− 0·9	38·7	37·2	90·8
Means	29·778	Highest. 97·1	Lowest. 12·7	Annual Range. 84·4	57·0	41·6	15·4	48·8	− 0·9	46·1	43·2	81·9

1881, Month.	Mean Elastic Force of Vapour.	Mean Weight of Vapour in a Cubic Foot of Air.	Mean Weight of a Cubic Foot of Air.	Mean Amount of Ozone.	Mean Amount of Cloud. (0–10.)	Rain. Number of Rainy Days.	Amount collected in a Gauge whose receiving Surface is 5 Inches above the Ground.	Wind. From Osler's Anemometer. Number of Hours of Prevalence of each Wind, referred to different Points of Azimuth. N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Number of Calm or nearly Calm Hours.	Mean Daily Pressure on the Square Foot.	From Robinson's Anemometer. Mean Daily Horizontal Movement of the Air.
	in.	grs.	grs.				in.	h	h	h	h	h	h	h	h	h	lbs.	miles.
January ...	0·153	1·8	561	1·7	6·8	9	1·663	118	190	98	51	52	145	54	36	0	0·51	256
February..	0·199	2·3	552	3·4	8·5	18	2·446	106	117	42	78	82	111	37	60	39	0·69	311
March	0·221	2·6	548	3·1	5·9	11	1·835	27	99	123	44	26	212	149	36	28	0·64	336
April	0·233	2·7	546	2·7	6·7	8	0·623	84	230	127	19	67	99	35	47	12	1·25	357
May	0·312	3·5	539	5·2	5·4	13	1·611	99	134	98	21	40	238	50	33	31	0·62	286
June......	0·360	4·0	532	5·4	6·6	9	1·863	83	42	33	68	115	233	53	62	31	0·11	230
July	0·434	4·8	525	3·0	6·1	12	2·137	71	49	11	37	47	326	142	53	8	0·12	259
August ...	0·403	4·5	529	4·1	7·4	17	3·888	50	11	4	41	89	349	147	53	0	0·28	302
September.	0·386	4·3	535	1·4	7·1	15	2·188	131	68	52	54	80	156	48	91	40	0·07	195
October ...	0·261	3·0	547	1·6	6·1	13	2·711	135	184	132	53	19	104	75	28	14	0·69	306
November .	0·306	3·5	542	4·0	7·4	16	2·265	0	3	72	54	189	335	36	2	29	0·88	361
December .	0·222	2·6	553	2·2	7·1	15	2·495	38	36	15	78	188	266	88	26	9	0·44*	297
Sums	..	..	..	..	..	156	25·725	942	1163	807	598	994	2574	914	527	241	..	..
Means	0·291	3·3	542	3·2	6·8	..	..	..	..	..	..	..	..	..	..	..	0·53	291

The greatest recorded pressure of the wind on the square foot in the year was 53 lbs. on October 14.
The greatest recorded daily horizontal movement of the air „ „ 999 miles on October 14.
The least recorded daily horizontal movement of the air „ „ 59 miles on May 25.

* Mean for 30 days.

MONTHLY MEAN READING of the BAROMETER at every HOUR of the DAY, as deduced from the PHOTOGRAPHIC RECORDS.

Hour, Greenwich Mean Solar Time (Civil reckoning).	1881. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Means.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Midnight	29·724	29·666	29·726	29·788	29·921	29·811	29·848	29·668	29·804	29·842	29·787	29·832	29·785
1h. a.m.	29·721	29·661	29·724	29·783	29·918	29·809	29·842	29·666	29·799	29·839	29·778	29·825	29·780
2 „	29·718	29·656	29·719	29·778	29·916	29·803	29·835	29·664	29·793	29·833	29·776	29·822	29·776
3 „	29·715	29·649	29·715	29·776	29·914	29·802	29·834	29·661	29·787	29·828	29·767	29·814	29·772
4 „	29·712	29·645	29·713	29·772	29·914	29·803	29·830	29·662	29·784	29·826	29·764	29·807	29·769
5 „	29·708	29·645	29·713	29·773	29·920	29·805	29·831	29·666	29·786	29·825	29·764	29·802	29·770
6 „	29·706	29·644	29·717	29·779	29·926	29·810	29·834	29·674	29·790	29·824	29·764	29·806	29·773
7 „	29·710	29·647	29·727	29·785	29·931	29·813	29·838	29·680	29·797	29·829	29·770	29·810	29·778
8 „	29·719	29·654	29·732	29·786	29·934	29·815	29·841	29·686	29·804	29·835	29·778	29·819	29·784
9 „	29·725	29·661	29·737	29·789	29·935	29·816	29·841	29·688	29·809	29·837	29·786	29·827	29·788
10 „	29·730	29·665	29·743	29·787	29·936	29·817	29·838	29·687	29·811	29·838	29·793	29·835	29·790
11 „	29·729	29·673	29·746	29·783	29·933	29·816	29·834	29·684	29·808	29·832	29·794	29·832	29·789
Noon	29·721	29·672	29·740	29·775	29·928	29·812	29·829	29·679	29·804	29·829	29·786	29·824	29·783
1h. p.m.	29·709	29·667	29·731	29·770	29·925	29·807	29·822	29·675	29·798	29·821	29·780	29·817	29·777
2 „	29·700	29·659	29·718	29·762	29·921	29·805	29·819	29·672	29·795	29·815	29·776	29·813	29·771
3 „	29·699	29·657	29·710	29·755	29·915	29·799	29·814	29·666	29·791	29·812	29·776	29·814	29·767
4 „	29·700	29·657	29·708	29·752	29·911	29·793	29·809	29·663	29·792	29·812	29·778	29·818	29·766
5 „	29·701	29·660	29·710	29·754	29·908	29·790	29·807	29·660	29·795	29·821	29·782	29·822	29·768
6 „	29·704	29·664	29·717	29·757	29·913	29·792	29·806	29·663	29·799	29·830	29·788	29·824	29·771
7 „	29·707	29·668	29·725	29·765	29·920	29·795	29·810	29·667	29·806	29·835	29·791	29·827	29·776
8 „	29·708	29·670	29·730	29·774	29·930	29·800	29·818	29·677	29·810	29·836	29·794	29·827	29·781
9 „	29·707	29·671	29·731	29·780	29·938	29·808	29·825	29·681	29·812	29·836	29·797	29·830	29·785
10 „	29·706	29·671	29·731	29·781	29·940	29·811	29·830	29·686	29·812	29·834	29·796	29·830	29·786
11 „	29·706	29·671	29·730	29·782	29·941	29·809	29·833	29·687	29·812	29·834	29·793	29·831	29·786
Means	29·712	29·661	29·725	29·774	29·925	29·806	29·828	29·673	29·800	29·829	29·782	29·821	29·778
Number of Days employed.	31	28	31	30	31	30	31	31	30	31	30	31	..

MONTHLY MEAN TEMPERATURE of the AIR at every HOUR of the DAY, as deduced from the PHOTOGRAPHIC RECORDS.

Hour, Greenwich Mean Solar Time (Civil reckoning).	1881. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Means.
	°	°	°	°	°	°	°	°	°	°	°	°	°
Midnight	31·1	37·1	39·6	41·0	48·3	53·0	60·0	55·5	52·1	43·7	47·2	39·1	45·6
1h. a.m.	31·0	37·1	39·5	40·8	47·5	52·6	59·1	55·0	52·0	43·2	47·2	39·1	45·3
2 „	30·8	36·7	39·1	40·8	47·0	52·2	58·5	54·5	51·9	43·0	47·4	39·2	45·1
3 „	30·4	36·6	38·8	40·7	46·2	51·7	58·0	54·1	51·5	42·7	47·6	39·1	44·8
4 „	30·2	36·7	38·7	40·1	46·0	51·6	57·7	53·7	51·4	42·2	47·8	39·0	44·6
5 „	30·0	36·8	38·5	39·8	46·2	52·0	58·0	53·7	51·5	42·0	48·0	38·8	44·6
6 „	29·9	36·9	38·4	40·4	48·2	53·6	59·4	54·2	51·7	41·8	47·9	38·9	45·1
7 „	29·7	36·9	38·7	42·0	50·8	55·9	61·8	55·9	52·6	41·9	47·8	38·8	46·1
8 „	29·5	37·2	40·0	44·5	53·9	58·7	64·9	57·9	53·9	43·5	48·0	38·6	47·5
9 „	30·2	37·7	42·3	47·3	56·6	61·3	67·3	60·2	55·8	46·0	48·8	39·2	49·4
10 „	31·1	38·4	44·1	49·9	58·7	62·7	69·3	61·9	57·7	47·8	50·0	40·1	51·0
11 „	32·4	39·2	45·8	51·4	60·3	64·3	71·4	63·5	59·3	49·3	51·3	41·0	52·4
Noon	33·7	39·7	47·2	52·6	61·5	65·4	73·0	64·8	60·6	50·4	52·0	41·8	53·6
1h. p.m.	34·4	40·1	48·1	53·1	61·9	65·7	74·2	65·8	61·4	50·6	52·3	42·3	54·2
2 „	34·7	40·4	49·0	52·9	62·1	65·5	74·6	66·1	62·1	50·5	52·3	42·5	54·4
3 „	34·2	40·5	48·9	52·8	62·1	65·9	74·6	65·5	62·1	49·4	51·5	41·9	54·1
4 „	33·5	40·0	48·0	51·6	61·3	65·5	74·1	64·8	61·3	48·6	50·4	41·3	53·4
5 „	33·0	39·3	46·4	50·2	60·0	64·1	72·7	63·5	59·5	46·9	49·6	40·5	52·1
6 „	32·5	38·6	44·5	48·4	58·0	62·0	70·8	62·0	57·7	45·7	49·1	40·1	50·8
7 „	32·1	38·1	43·0	46·1	55·8	60·4	68·6	60·3	55·9	44·9	48·7	39·7	49·5
8 „	31·6	37·7	42·0	44·3	53·2	57·9	65·9	58·7	54·7	44·2	48·3	39·5	48·2
9 „	31·4	37·4	41·2	43·4	51·6	56·0	63·9	57·5	53·5	43·8	48·1	39·3	47·3
10 „	31·2	37·1	40·5	42·6	50·5	54·7	62·4	56·5	52·9	43·3	47·8	39·1	46·6
11 „	31·2	36·9	40·3	41·9	49·5	53·6	60·9	55·8	52·6	43·3	47·8	39·1	46·1
Means	31·7	38·0	42·6	45·8	54·0	58·6	65·9	59·2	55·7	45·4	49·0	39·9	48·8
Number of Days employed.	31	28	31	30	31	30	29	31	30	31	30	31	..

MONTHLY MEAN TEMPERATURE of EVAPORATION at every HOUR of the DAY, as deduced from the PHOTOGRAPHIC RECORDS.

Hour, Greenwich Mean Solar Time (Civil reckoning).	1881. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Means.
Midnight	30.3	36.1	38.3	39.6	46.8	51.6	57.4	53.9	51.6	42.7	46.1	38.3	44.4
1h, a.m.	30.2	36.0	38.2	39.5	46.2	51.4	56.9	53.7	51.6	42.4	46.2	38.4	44.2
2 ,,	30.1	35.7	38.0	39.5	45.7	50.9	56.4	53.1	51.4	42.2	46.2	38.4	44.0
3 ,,	29.7	35.7	37.8	39.3	45.2	50.5	56.1	52.9	51.1	41.9	46.6	38.3	43.8
4 ,,	29.6	35.9	37.9	38.9	45.1	50.4	55.7	52.5	51.0	41.5	46.7	38.2	43.6
5 ,,	29.5	36.0	37.7	38.7	45.4	50.6	56.0	52.4	51.0	41.3	46.7	38.0	43.6
6 ,,	29.3	35.8	37.7	39.1	46.8	51.7	56.8	52.8	51.2	41.1	46.7	38.0	43.9
7 ,,	29.1	35.8	38.0	40.2	48.4	53.1	58.1	53.9	51.8	41.4	46.6	37.9	44.5
8 ,,	29.0	36.1	38.7	42.0	50.1	54.4	59.6	55.2	52.8	42.3	46.7	37.8	45.4
9 ,,	29.4	36.4	40.2	43.5	51.6	55.5	60.7	56.3	54.1	44.1	47.3	38.1	46.4
10 ,,	30.0	37.0	41.3	44.8	53.0	55.9	61.5	57.0	55.3	45.2	48.0	38.8	47.3
11 ,,	31.0	37.4	42.0	45.7	53.6	56.7	62.6	57.8	56.2	45.8	48.7	39.4	48.1
Noon	32.1	37.9	42.7	46.1	54.2	57.1	63.5	58.7	56.7	46.7	49.2	39.9	48.7
1h, p.m.	32.6	38.0	43.2	46.6	54.3	57.1	64.1	59.3	57.0	46.7	49.3	40.3	49.0
2 ,,	32.8	38.1	43.7	46.4	54.4	57.0	64.1	59.7	57.3	46.5	49.2	40.4	49.1
3 ,,	32.6	38.1	43.8	46.3	54.5	57.2	64.1	59.7	57.5	46.0	48.7	39.9	49.0
4 ,,	32.1	37.7	43.2	45.8	54.0	57.0	63.4	59.2	56.9	45.3	48.2	39.6	48.5
5 ,,	31.7	37.4	42.4	44.7	53.2	56.5	62.7	58.5	56.1	44.6	47.8	39.1	47.9
6 ,,	31.4	36.9	41.5	43.8	52.3	55.6	61.7	57.9	55.2	43.8	47.6	38.9	47.2
7 ,,	31.1	36.5	40.6	42.6	51.2	54.7	60.8	57.1	54.1	43.2	47.3	38.6	46.5
8 ,,	30.8	36.3	39.9	41.6	49.9	53.9	59.8	56.2	53.3	43.0	47.1	38.5	45.9
9 ,,	30.5	36.1	39.4	41.1	48.9	52.8	59.0	55.3	52.6	42.5	46.9	38.4	45.3
10 ,,	30.4	35.9	38.9	40.6	48.2	52.3	58.4	54.8	52.2	42.3	46.7	38.2	44.9
11 ,,	30.3	35.8	38.7	40.3	47.5	51.9	57.6	54.3	51.9	42.3	46.6	38.3	44.6
Means	30.6	36.6	40.2	42.4	50.0	54.0	59.9	55.9	53.7	43.5	47.4	38.7	46.1
Number of Days employed.	31	28	31	30	31	30	29	31	30	31	30	31	..

MONTHLY MEAN TEMPERATURE of the DEW POINT at every HOUR of the DAY, as deduced by GLAISHER'S TABLES from the corresponding AIR and EVAPORATION TEMPERATURES.

Hour, Greenwich Mean Solar Time (Civil reckoning).	1881. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Means.
Midnight	28.2	34.7	36.6	37.8	45.2	50.2	55.1	52.4	51.1	41.5	44.9	37.3	42.9
1h, a.m.	28.0	34.5	36.5	37.9	44.8	50.2	54.9	52.4	51.2	41.4	45.1	37.5	42.9
2 ,,	28.2	34.3	36.6	37.9	44.3	49.6	54.5	51.7	50.9	41.2	44.9	37.4	42.6
3 ,,	27.7	34.5	36.5	37.6	44.1	49.3	54.4	51.7	50.7	40.9	45.5	37.3	42.5
4 ,,	27.8	34.8	36.9	37.4	44.1	49.2	53.9	51.3	50.6	40.7	45.5	37.2	42.4
5 ,,	27.9	34.9	36.6	37.3	44.5	49.2	54.2	51.1	50.5	40.5	45.3	37.0	42.4
6 ,,	27.6	34.3	36.8	37.5	45.3	49.9	54.5	51.4	50.7	40.3	45.4	36.8	42.5
7 ,,	27.3	34.3	37.1	38.0	45.9	50.5	55.0	52.0	51.0	40.8	45.3	36.7	42.8
8 ,,	27.4	34.6	37.0	39.0	46.4	50.5	55.2	52.8	51.7	40.9	45.3	36.7	43.1
9 ,,	27.0	34.7	37.6	39.2	47.0	50.5	55.5	52.9	52.5	41.9	45.6	36.7	43.4
10 ,,	27.1	35.1	38.0	39.4	47.9	50.1	55.4	52.8	53.1	42.3	45.9	37.1	43.7
11 ,,	28.0	35.1	37.6	39.8	47.7	50.4	55.9	53.1	53.4	42.1	46.0	37.4	43.9
Noon	29.2	35.6	37.7	39.6	47.9	50.3	56.5	53.6	53.4	42.8	46.3	37.5	44.2
1h, p.m.	29.5	35.3	37.8	40.1	47.8	50.1	56.7	54.0	53.2	42.6	46.3	37.9	44.3
2 ,,	29.2	35.1	38.0	39.9	47.8	50.0	56.5	54.5	53.2	42.3	46.1	37.9	44.2
3 ,,	29.8	35.0	38.3	39.8	48.0	50.2	56.5	55.0	53.6	42.4	45.8	37.5	44.3
4 ,,	29.5	34.7	37.9	39.9	47.7	50.0	55.6	54.5	53.1	41.7	45.9	37.5	44.0
5 ,,	29.1	34.9	37.9	38.9	47.2	50.2	55.3	54.3	53.1	42.0	45.9	37.3	43.8
6 ,,	29.1	34.6	38.0	38.8	47.2	50.1	54.7	54.4	53.0	41.6	46.0	37.4	43.7
7 ,,	28.8	34.3	37.7	38.6	46.9	49.7	54.7	54.3	52.4	41.2	45.8	37.2	43.5
8 ,,	29.0	34.4	37.3	38.4	46.6	50.3	54.8	54.0	51.9	41.6	45.8	37.2	43.4
9 ,,	28.3	34.3	37.1	38.4	46.2	49.8	54.9	53.3	51.7	40.9	45.6	37.2	43.1
10 ,,	28.4	34.2	36.9	38.2	45.8	50.0	55.0	53.3	51.5	41.1	45.5	37.0	43.1
11 ,,	28.0	34.3	36.7	38.3	45.4	50.3	54.8	52.9	51.2	41.1	45.3	37.3	43.0
Means	28.3	34.7	37.3	38.7	46.3	50.0	55.2	53.1	52.0	41.5	45.6	37.2	43.3

Monthly Mean Degree of Humidity (Saturation = 100) at every Hour of the Day, as deduced by Glaisher's Tables from the corresponding Air and Evaporation Temperatures.

Hour, Greenwich Mean Solar Time (Civil reckoning).	1881. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Means.
Midnight	88	91	90	89	89	90	84	90	97	92	92	94	90
1h. a.m.	87	90	90	90	91	92	87	91	97	94	93	94	91
2 ,,	90	92	91	90	91	91	86	90	97	94	92	94	92
3 ,,	89	93	93	89	93	92	88	92	97	94	93	94	92
4 ,,	90	93	94	90	94	92	87	92	97	94	92	94	92
5 ,,	91	93	94	91	94	90	87	91	96	94	91	94	92
6 ,,	90	91	94	90	90	87	85	90	96	94	92	93	91
7 ,,	90	91	94	86	84	83	79	88	95	96	92	93	89
8 ,,	91	90	90	81	75	75	71	83	92	90	91	94	85
9 ,,	87	89	84	74	70	68	66	77	89	87	89	91	81
10 ,,	84	88	79	67	67	65	61	72	85	83	86	90	77
11 ,,	84	86	73	65	63	61	58	69	82	76	82	87	74
Noon	84	86	70	62	61	58	56	67	77	76	81	86	72
1h. p.m.	82	83	68	62	60	57	55	66	75	75	80	85	71
2 ,,	78	82	66	62	59	57	54	66	73	75	80	84	70
3 ,,	79	81	67	62	60	56	54	69	74	77	81	86	71
4 ,,	84	82	68	65	61	57	53	70	75	78	85	87	72
5 ,,	85	85	73	66	63	61	54	73	80	84	88	89	75
6 ,,	87	87	77	70	67	65	57	77	84	86	90	90	78
7 ,,	87	86	82	76	72	68	61	81	88	87	90	91	81
8 ,,	89	88	84	79	78	76	68	84	90	91	92	92	84
9 ,,	87	89	86	82	82	80	73	86	94	90	92	93	86
10 ,,	88	89	88	85	84	84	77	89	95	92	92	93	88
11 ,,	86	91	88	88	87	89	81	90	96	92	92	94	89
Means	87	88	83	78	76	75	70	81	88	87	89	91	83

Total Amount of Sunshine registered in each Hour of the Day in each Month, as derived from the Records of Campbell's Self-registering Instrument, for the Year 1881.

1881, Month.	Registered Duration of Sunshine in the Hour ending 5h. a.m.	6h. a.m.	7h. a.m.	8h. a.m.	9h. a.m.	10h. a.m.	11h. a.m.	Noon.	1h. p.m.	2h. p.m.	3h. p.m.	4h. p.m.	5h. p.m.	6h. p.m.	7h. p.m.	8h. p.m.	Total registered Duration of Sunshine in each Month.	Corresponding aggregate Period during which the Sun was above Horizon.	Mean Altitude of the Sun at Noon.
	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	°
January ..	..	..	..	..	0·3	3·4	4·4	6·1	6·8	6·3	4·1	0·4	..	..	..	..	31·8	259·1	18
February .	..	..	..	0·2	1·5	3·9	3·4	2·6	4·4	4·1	5·1	0·9	..	..	..	..	26·1	277·9	26
March ...	..	..	1·0	3·4	6·5	12·2	13·7	15·6	13·9	14·9	12·8	12·4	8·1	1·3	..	..	115·8	366·9	37
April	..	..	2·5	5·0	10·7	12·6	15·1	14·3	14·4	11·5	11·7	11·0	9·7	7·4	0·2	..	126·1	414·9	48
May	0·2	7·0	11·8	14·7	17·1	19·6	18·2	16·5	16·1	16·7	16·4	13·7	15·3	13·2	5·4	0·3	202·2	482·1	57
June . ..	1·0	9·8	14·2	14·9	16·1	15·2	16·6	17·9	16·0	14·4	11·9	13·2	12·4	9·6	2·5	..	185·7	494·5	62
July	0·8	9·7	15·3	18·3	16·0	17·2	18·2	18·3	18·8	17·8	16·0	14·7	12·2	10·8	7·1	0·3	211·5	496·8	60
August ..	..	0·6	9·4	11·3	12·7	12·5	14·0	12·7	15·7	12·8	11·5	10·3	9·5	5·7	1·4	..	140·1	449·1	52
September	..	..	0·1	1·1	3·9	5·3	8·2	7·8	8·7	11·6	9·4	10·6	6·6	0·5	..	..	73·8	376·9	41
October	..	..	..	2·2	9·2	12·3	13·0	12·4	13·4	13·2	10·2	7·5	3·2	..	..	..	96·6	328·7	30
November	..	..	..	..	1·3	4·8	8·8	10·5	11·2	10·6	6·3	1·7	..	..	..	..	55·2	264·4	20
December	..	..	..	..	0·1	4·1	7·4	8·2	6·7	7·3	2·3	..	..	..	..	..	36·1	242·7	16

The hours are reckoned from apparent noon.

The total registered duration of sunshine during the year was 1301·0 hours; the corresponding aggregate period during which the Sun was above the horizon was 4454·0 hours; the mean proportion for the year (constant sunshine = 1) was therefore 0·292.

My time scale gives a picture of Sunshine and Cloud

0708
1·000

1881. Greenwich report

Proportion

Sunshine 0. 292
Cloud 0. 708
Sunrise to sunset } 1.000

Sunshine 1301. 0 hours.
Cloud — 3153
Sunrise to sunset — 4454. 0 hours

Roughly 1 — sunshine
3 — cloud.
4 — Sunrise to sunset.

...t (24 French feet) below the surface of the soil, at Noon
...ear.

...ly.	August.	September.	October.	November.	December.
	°	°	°	°	°
·92	49 ·68	50 ·72	51 ·64	52 ·17	52 ·28
·94	49 ·72	50 ·75	51 ·67	52 ·18	52 ·30
·97	49 ·75	50 ·78	51 ·67	52 ·22	52 ·28
·98	49 ·78	50 ·82	51 ·70	52 ·26	52 ·26
·01	49 ·82	50 ·85	51 ·71	52 ·28	52 ·27
·02	49 ·83	50 ·90	51 ·73	52 ·27	52 ·26
·04	49 ·86	50 ·92	51 ·76	52 ·27	52 ·24
·06	49 ·90	50 ·96	51 ·77	52 ·27	52 ·23
·07	49 ·92	51 ·00	51 ·80	52 ·27	52 ·21
·10	49 ·96	51 ·02	51 ·83	52 ·31	52 ·17
·14	50 ·00	51 ·05	51 ·87	52 ·32	52 ·23
·15	50 ·02	51 ·09	51 ·88	52 ·32	52 ·18
·17	50 ·05	51 ·12	51 ·90	52 ·34	52 ·17
·20	50 ·08	51 ·17	51 ·93	52 ·32	52 ·18
·23	50 ·12	51 ·17	51 ·93	52 ·32	52 ·17
·25	50 ·16	51 ·22	51 ·93	52 ·33	52 ·17
·27	50 ·19	51 ·26	51 ·97	52 ·33	52 ·16
·32	50 ·23	51 ·30	51 ·99	52 ·31	52 ·14
·33	50 ·27	51 ·32	52 ·00	52 ·33	52 ·13
·34	50 ·30	51 ·36	52 ·03	52 ·34	52 ·12
·36	50 ·34	51 ·37	52 ·04	52 ·33	52 ·11
·38	50 ·38	51 ·40	52 ·05	52 ·33	52 ·08
·42	50 ·42	51 ·45	52 ·07	52 ·32	52 ·07
·46	50 ·44	51 ·46	52 ·09	52 ·33	52 ·06
·47	50 ·48	51 ·49	52 ·10	52 ·33	52 ·06
·50	50 ·52	51 ·51	52 ·12	52 ·30	52 ·06
·52	50 ·55	51 ·54	52 ·12	52 ·30	52 ·05
·56	50 ·59	51 ·57	52 ·13	52 ·32	52 ·03
·58	50 ·62	51 ·57	52 ·14	52 ·29	52 ·02
·61	50 ·66	51 ·60	52 ·16	52 ·28	52 ·00
9 ·64	50 ·68		52 ·15		51 ·98
9 ·26	50 ·17	51 ·19	51 ·93	52 ·30	52 ·15

values is 50°·50.

feet (12 French feet) below the surface of the soil, at Noon
Year.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°		°	°	°
1	50 ·10	47 ·77	46 ·12	45 ·98	46 ·58	48 ·43	51 ·32	54 ·40	55 ·80	55 ·70	54 ·28	52 ·50
2	50 ·05	47 ·69	46 ·10	45 ·98	46 ·60	48 ·54	51 ·40	54 ·49	55 ·80	55 ·71	54 ·22	52 ·49
3	49 ·98	47 ·59	46 ·10	45 ·98	46 ·63	48 ·61	51 ·50	54 ·59	55 ·81	55 ·70	54 ·14	52 ·46
4	49 ·90	47 ·49	46 ·08	45 ·98	46 ·68	48 ·70	51 ·63	54 ·69	55 ·83	55 ·67	54 ·16	52 ·38
5	49 ·83	47 ·38	46 ·04	45 ·99	46 ·71	48 ·79	51 ·72	54 ·78	55 ·87	55 ·60	54 ·09	52 ·36
6	49 ·80	47 ·24	46 ·00	45 ·97	46 ·76	48 ·84	51 ·72	54 ·77	55 ·90	55 ·61	53 ·97	52 ·31
7	49 ·73	47 ·19	45 ·91	45 ·98	46 ·80	48 ·95	51 ·80	54 ·86	55 ·87	55 ·62	53 ·88	52 ·23
8	49 ·67	47 ·10	45 ·81	45 ·98	46 ·86	49 ·04	51 ·90	54 ·93	55 ·89	55 ·59	53 ·78	52 ·1[illegible]

MONTHLY MEAN DEGREE of HUMIDITY (Saturation = 1
corresponding A

Hour, Greenwich Mean Solar Time (Civil reckoning).	January.	February.	March.	April.	May.
Midnight	88	91	90	89	89
1h. a.m.	87	90	90	90	91
2 ,,	90	92	91	90	91
3 ,,	89	93	93	89	93
4 ,,	90	93	94	90	94
5 ,,	91	93	94	91	94
6 ,,	90	91	94	90	90
7 ,,	90	91	94	86	84
8 ,,	91	90	90	81	75
9 ,,	87	89	84	74	70
10 ,,	84	88	79	67	67
11 ,,	84	86	73	65	63
Noon	84	86	70	62	61
1h. p.m.	82	83	68	62	60
2 ,,	78	82	66	62	59
3 ,,	79	81	67	62	60
4 ,,	84	82	68	65	61
5 ,,	85	85	73	66	63
6 ,,	87	87	77	70	67
7 ,,	87	86	82	76	72
8 ,,	89	88	84	79	78
9 ,,	87	89	86	82	82
10 ,,	88	89	88	85	84
11 ,,	86	91	88	88	87
Means	87	88	83	78	76

TOTAL AMOUNT of SUNSHINE registered in each HOUR
SELF-REGISTERIN

1881, Month.	Registered Duration of S																		
	5h. a.m.	6h. a.m.	7h. a.m.	8h. a.m.	9h. a.m.	10h. a.m.	11h. a.m.	Noon.											
	h	h	h	h	h	h	h	h											
January ..	..	..	..	..	0·3	3·4	4·4	6·1											
February .	..	..	..	0·2	1·5	3·9	3·4	2·6											
March ...	..	..	1·0	3·4	6·5	12·2	13·7	15·6											
April	..	..	2·5	5·0	10·7	12·6	15·1	14·3											
May	0·2	7·0	11·8	14·7	17·1	19·6	18·2	16·5											
June . ..	1·0	9·8	14·2	14·9	16·1	15·2	16·6	17·9											
July	0·8	9·7	15·3	18·3	16·0	17·2	18·2	18·3	18·8	17·8	16·0	14·7	12·2	10·8	7·1	0·3	211·5	496·8	60
August ..	..	0·6	9·4	11·3	12·7	12·5	14·0	12·7	15·7	12·8	11·5	10·3	9·5	5·7	1·4	..	140·1	449·1	52
September	..	..	0·1	1·1	3·9	5·3	8·2	7·8	8·7	11·6	9·4	10·6	6·6	0·5	..	..	73·8	376·9	41
October	..	..	..	2·2	9·2	12·3	13·0	12·4	13·4	13·2	10·2	7·5	3·2	..	..	..	96·6	328·7	30
November	..	..	..	..	1·3	4·8	8·8	10·5	11·2	10·6	6·3	1·7	..	..	..	..	55·2	264·4	20
December	..	..	..	..	0·1	4·1	7·4	8·2	6·7	7·3	2·3	..	..	..	..	..	36·1	242·7	16

The hours are reckoned from apparent noon.

The total registered duration of sunshine during the year was 1301·0 hours; the corresponding aggregate period during which the Sun was above the horizon was 4454·0 hours; the mean proportion for the year (constant sunshine = 1) was therefore 0·292.

My time scale gives a picture of Sunshine and Cloud

0708
1·000

(I.)—Reading of a Thermometer whose bulb is sunk to the depth of 25·6 feet (24 French feet) below the surface of the soil, at Noon on every Day of the Year.

1881.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	52·01	51·26	50·37	49·44	48·87	48·66	48·92	49·68	50·72	51·64	52·17	52·28
2	52·01	51·25	50·35	49·42	48·85	48·67	48·94	49·72	50·75	51·67	52·18	52·30
3	51·98	51·24	50·30	49·38	48·85	48·67	48·97	49·75	50·78	51·67	52·22	52·28
4	51·96	51·22	50·27	49·36	48·83	48·67	48·98	49·78	50·82	51·70	52·26	52·26
5	51·93	51·18	50·26	49·35	48·82	48·66	49·01	49·82	50·85	51·71	52·28	52·27
6	51·92	51·15	50·23	49·31	48·82	48·66	49·02	49·83	50·90	51·73	52·27	52·26
7	51·87	51·11	50·19	49·26	48·82	48·65	49·04	49·86	50·92	51·76	52·27	52·24
8	51·85	51·11	50·15	49·27	48·80	48·66	49·06	49·90	50·96	51·77	52·27	52·23
9	51·83	51·07	50·10	49·26	48·78	48·66	49·07	49·92	51·00	51·80	52·27	52·21
10	51·80	51·03	50·08	49·25	48·77	48·68	49·10	49·96	51·02	51·83	52·31	52·17
11	51·77	51·00	50·03	49·23	48·76	48·68	49·14	50·00	51·05	51·87	52·32	52·23
12	51·74	50·97	50·00	49·20	48·75	48·70	49·15	50·02	51·09	51·88	52·32	52·18
13	51·71	50·94	49·96	49·18	48·74	48·70	49·17	50·05	51·12	51·90	52·34	52·17
14	51·68	50·91	49·93	49·17	48·73	48·72	49·20	50·08	51·17	51·93	52·32	52·18
15	51·65	50·87	49·89	49·15	48·73	48·77	49·23	50·12	51·17	51·93	52·32	52·17
16	51·63	50·84	49·87	49·12	48·71	48·74	49·25	50·16	51·22	51·93	52·33	52·17
17	51·62	50·81	49·84	49·12	48·72	48·74	49·27	50·19	51·26	51·97	52·33	52·16
18	51·60	50·77	49·83	49·10	48·70	48·75	49·32	50·23	51·30	51·99	52·31	52·14
19	51·56	50·75	49·78	49·07	48·70	48·75	49·33	50·27	51·32	52·00	52·33	52·13
20	51·51	50·71	49·75	49·04	48·70	48·76	49·34	50·30	51·36	52·03	52·34	52·12
21	51·45	50·65	49·71	49·02	48·69	48·77	49·36	50·34	51·37	52·04	52·33	52·11
22	51·42	50·64	49·68	49·00	48·68	48·79	49·38	50·38	51·40	52·05	52·33	52·08
23	51·43	50·60	49·67	49·00	48·69	48·79	49·42	50·42	51·45	52·07	52·32	52·07
24	51·39	50·56	49·64	48·98	48·67	48·82	49·46	50·44	51·46	52·09	52·33	52·06
25	51·37	50·54	49·60	48·97	48·67	48·83	49·47	50·48	51·49	52·10	52·33	52·06
26	51·37	50·49	49·57	48·95	48·66	48·84	49·50	50·52	51·51	52·12	52·30	52·06
27	51·37	50·44	49·55	48·93	48·66	48·86	49·52	50·55	51·54	52·12	52·30	52·05
28	51·35	50·40	49·54	48·92	48·66	48·87	49·56	50·59	51·57	52·13	52·32	52·03
29	51·34		49·50	48·92	48·66	48·88	49·58	50·62	51·57	52·14	52·29	52·02
30	51·32		49·47	48·90	48·66	48·92	49·61	50·66	51·60	52·16	52·28	52·00
31	51·31		49·45		48·66		49·64	50·68		52·15		51·98
Means.	51·64	50·88	49·89	49·14	48·74	48·74	49·26	50·17	51·19	51·93	52·30	52·15

The mean of the twelve monthly values is 50°·50.

(II.)—Reading of a Thermometer whose bulb is sunk to the depth of 12·8 feet (12 French feet) below the surface of the soil, at Noon on every Day of the Year.

1881.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°		°	°	°
1	50·10	47·77	46·12	45·98	46·58	48·43	51·32	54·40	55·80	55·70	54·28	52·50
2	50·05	47·69	46·10	45·98	46·60	48·54	51·40	54·49	55·80	55·71	54·22	52·49
3	49·98	47·59	46·10	45·98	46·63	48·61	51·50	54·59	55·81	55·70	54·14	52·46
4	49·90	47·49	46·08	45·98	46·68	48·70	51·63	54·69	55·83	55·67	54·16	52·38
5	49·83	47·38	46·04	45·99	46·71	48·79	51·72	54·78	55·87	55·60	54·09	52·36
6	49·80	47·24	46·00	45·97	46·76	48·84	51·72	54·77	55·90	55·61	53·97	52·31
7	49·73	47·19	45·91	45·98	46·80	48·95	51·80	54·86	55·87	55·62	53·88	52·23
8	49·67	47·10	45·81	45·98	46·86	49·04	51·90	54·93	55·89	55·59	53·78	52·1[illegible]

(II.)—Reading of a Thermometer whose bulb is sunk to the depth of 12·8 feet (12 French feet) below the surface of the soil, at Noon on every Day of the Year—*concluded.*

1881.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
9	49·61	47·00	45·79	46·00	46·88	49·18	52·00	54·92	55·90	55·56	53·69	52·12
10	49·52	46·97	45·75	45·97	46·91	49·29	52·11	55·00	55·85	55·57	53·62	52·06
11	49·47	46·86	45·70	46·00	46·97	49·40	52·25	55·08	55·84	55·59	53·53	51·99
12	49·41	46·80	45·66	45·98	47·03	49·52	52·35	55·09	55·85	55·54	53·47	51·98
13	49·34	46·78	45·67	46·00	47·09	49·65	52·47	55·13	55·87	55·49	53·39	51·87
14	49·28	46·71	45·62	46·00	47·13	49·77	52·58	55·20	55·88	55·47	53·29	51·84
15	49·21	46·68	45·61	46·00	47·19	49·88	52·71	55·29	55·81	55·39	53·21	51·78
16	49·18	46·63	45·63	46·00	47·25	49·97	52·79	55·36	55·83	55·30	53·16	51·70
17	49·10	46·56	45·64	46·03	47·32	50·05	52·83	55·40	55·88	55·30	53·10	51·63
18	49·01	46·54	45·68	46·06	47·38	50·12	52·99	55·45	55·89	55·26	53·00	51·56
19	48·93	46·50	45·69	46·08	47·43	50·21	53·09	55·50	55·86	55·20	53·00	51·48
20	48·83	46·49	45·70	46·09	47·50	50·30	53·10	55·54	55·87	55·18	52·99	51·37
21	48·75	46·42	45·70	46·11	47·59	50·39	53·20	55·58	55·81	55·10	52·93	51·27
22	48·70	46·42	45·72	46·17	47·66	50·48	53·29	55·64	55·77	55·02	52·90	51·14
23	48·63	46·36	45·78	46·22	47·77	50·54	53·42	55·69	55·77	54·99	52·86	51·06
24	48·54	46·34	45·79	46·26	47·81	50·67	53·57	55·67	55·79	54·90	52·82	50·98
25	48·43	46·30	45·80	46·31	47·89	50·70	53·64	55·70	55·78	54·83	52·79	50·92
26	48·36	46·22	45·83	46·36	47·95	50·83	53·76	55·74	55·78	54·77	52·71	50·87
27	48·30	46·20	45·84	46·40	48·03	50·88	53·85	55·73	55·73	54·68	52·68	50·78
28	48·19	46·13	45·90	46·44	48·10	51·00	54·00	55·76	55·71	54·61	52·66	50·70
29	48·09		45·90	46·49	48·18	51·19	54·10	55·79	55·72	54·51	52·57	50·64
30	47·99		45·92	46·54	48·26	51·22	54·19	55·81	55·71	54·43	52·52	50·52
31	47·89		45·96		48·34		54·29	55·76		54·33		50·47
Means .	49·09	46·80	45·82	46·11	47·33	49·84	52·76	55·27	55·82	55·23	53·31	51·60

The mean of the twelve monthly values is 50°·75.

(III.)—Reading of a Thermometer whose bulb is sunk to the depth of 6·4 feet (6 French feet) below the surface of the soil, at Noon on every Day of the Year.

1881.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	47·60	43·48*	43·61	45·22	47·68	52·44	56·50	60·33	59·40	57·97	53·03	51·68
2	47·60	43·46*	43·50	45·19	47·74	52·64	56·58	60·32	59·35	57·87	52·83	51·57
3	47·51	43·45*	43·43*	45·18	47·86	52·84	56·70	60·30	59·28	57·79	52·60	51·44
4	47·40	43·47*	43·38*	45·19	48·00	53·10	56·90	60·30	59·20	57·62	52·43	51·30
5	47·31	43·51*	43·36*	45·20	48·13	53·31	57·10	60·34	59·10	57·47	52·20	51·22
6	47·30	43·61	43·35*	45·23	48·23	53·67	57·19	60·26	59·01	57·37	52·01	51·10
7	47·20	43·79	43·37*	45·27	48·30	53·83	57·41	60·36	58·90	57·24	51·94	50·98
8	47·11	43·89	43·42*	45·30	48·41	54·06	57·73	60·46	58·83	57·02	51·95	50·80
9	47·05	43·92	43·53*	45·35	48·58	54·20	57·98	60·42	58·80	56·83	52·00	50·68
10	46·91	43·92	43·66*	45·41	48·76	54·27	58·12	60·50	58·70	56·58	52·06	50·53
11	46·76	43·90	43·80	45·48	48·97	54·29	58·26	60·59	58·67	56·56	52·10	50·39
12	46·61	44·00	44·02	45·57	49·20	54·29	58·31	60·52	58·64	56·32	52·13	50·20
13	46·47	44·09	44·27	45·70	49·37	54·35	58·38	60·57	58·60	56·12	52·20	50·00
14	46·32	44·14	44·50	45·87	49·44	54·27	58·50	60·53	58·57	56·01	52·21	49·80
15	46·19	44·11	44·70	46·01	49·58	54·35	58·71	60·50	58·41	55·83	52·27	49·61

The symbol * indicates that the reading was estimated, in consequence of the fluid having gone out of range of the scale.

(III.)—Reading of a Thermometer whose bulb is sunk to the depth of 6·4 feet (6 French feet) below the surface of the soil, at Noon on every Day of the Year—*concluded.*

1881.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
16	46·00	44·03	44·85	46·21	49·72	54·45	58·84	60·40	58·38	55·70	52·32	49·41
17	45·80	43·96	45·00	46·45	49·92	54·55	59·00	60·27	58·40	55·64	52·33	49·22
18	45·60	43·96	45·10	46·67	50·09	54·67	59·33	60·18	58·33	55·49	52·37	48·84
19	45·35	43·96	45·19	46·87	50·20	54·83	59·59	60·12	58·22	55·26	52·40	48·68
20	45·15	44·00	45·23	47·05	50·31	55·01	59·68	60·09	58·18	55·01	52·40	48·54
21	45·00	44·00	45·32	47·23	50·46	55·18	59·92	60·02	58·12	54·78	52·32	48·42
22	44·79	44·01	45·41	47·38	50·54	55·31	60·10	60·01	58·09	54·58	52·26	48·36
23	44·58	44·01	45·53	47·43	50·68	55·50	60·30	59·95	58·12	54·29	52·20	48·30
24	44·42	43·97	45·57	47·43	50·80	55·69	60·46	59·84	58·19	53·95	52·19	48·20
25	44·24	43·88	45·53	47·45	50·98	55·79	60·46	59·80	58·19	53·88	52·14	48·10
26	44·09	43·80	45·51	47·43	51·12	55·98	60·50	59·79	58·15	53·82	52·06	47·92
27	43·92	43·70	45·50	47·48	51·36	56·09	60·44	59·70	58·10	53·72	51·83	47·73
28	43·80	43·66	45·48	47·51	51·59	56·19	60·50	59·64	58·10	53·67	51·81	47·57
29	43·66		45·41	47·58	51·80	56·30	60·47	59·60	58·09	53·51	51·78	47·47
30	43·57*		45·33	47·62	52·05	56·40	60·39	59·59	58·03	53·40	51·72	47·40
31	43·51*		45·28		52·28		60·31	59·44		53·20		47·32
Means.	45·77	43·85	44·55	46·30	49·75	54·60	58·86	60·15	58·54	55·63	52·20	49·44
The mean of the twelve monthly values is 51°·64.												

The symbol * indicates that the reading was estimated, in consequence of the fluid having gone out of range of the scale.

(IV.)—Reading of a Thermometer whose bulb is sunk to the depth of 3·2 feet (3 French feet) below the surface of the soil, at Noon on every Day of the Year.

1881.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	43·86	38·90	39·50	42·62	47·78	55·87	59·65	62·88	59·93	57·42	48·45	48·52
2	43·41	39·20	39·20	42·78	48·07	56·52	60·19	62·71	59·60	57·17	47·83	48·40
3	43·38	39·44	38·98	43·03	48·30	57·19	60·82	62·80	59·27	56·83	47·48	48·24
4	43·42	40·11	38·90	43·20	48·41	57·88	61·32	62·92	59·09	56·50	47·50	48·16
5	43·32	40·79	39·06	43·21	48·32	58·30	62·07	63·30	58·90	56·20	48·09	47·83
6	43·30	41·09	39·85	43·25	48·46	58·38	62·67	63·53	58·82	55·70	48·83	47·72
7	43·09	41·02	40·93	43·45	49·13	57·93	63·11	63·90	58·86	55·16	49·50	47·49
8	42·69	40·61	41·92	43·63	49·80	57·27	62·68	63·97	59·04	54·75	49·68	47·49
9	42·30	40·66	42·45	43·80	50·30	56·60	62·22	63·80	59·09	54·41	49·97	47·10
10	42·12	40·90	42·69	44·10	50·58	56·18	61·80	63·59	59·00	54·10	50·11	46·58
11	41·86	41·29	43·19	44·51	50·66	55·87	61·81	63·31	58·88	53·88	50·21	46·02
12	41·65	41·40	43·73	44·93	50·60	55·88	62·10	62·90	58·60	53·90	50·49	45·54
13	41·28	41·07	44·08	45·50	50·69	56·20	62·59	62·62	58·45	53·90	50·79	45·20
14	40·85	40·61	44·12	46·09	51·00	56·61	63·10	62·09	58·42	53·81	50·95	44·89
15	40·50	40·40	44·13	46·60	51·50	57·00	63·72	61·68	58·31	53·80	51·02	44·50
16	40·09	40·43	44·10	47·05	51·79	57·30	64·40	61·45	58·26	53·37	51·01	44·45
17	39·62	40·47	44·02	47·41	51·83	57·70	64·91	61·42	58·04	52·70	50·90	44·48
18	39·22	40·50	44·03	47·70	51·60	58·08	65·42	61·30	57·94	51·93	50·80	44·36
19	38·78	40·77	44·10	48·04	51·65	58·30	65·73	61·48	58·10	51·49	50·43	44·39
20	38·58	41·00	44·40	47·98	51·81	58·47	65·80	61·39	58·40	51·20	50·21	44·33

(IV.)—Reading of a Thermometer whose bulb is sunk to the depth of 3·2 feet (3 French feet) below the surface of the soil, at Noon on every Day of the Year—*concluded.*

1881.												
Days of the Month	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
21	38·38	40·95	44·54	47·55	52·03	58·72	65·89	61·18	58·53	51·00	50·09	44·19
22	38·29	40·77	44·50	47·01	52·20	59·10	65·49	61·14	58·70	50·96	50·13	44·00
23	38·10	40·37	44·06	46·72	52·60	59·37	65·13	60·90	58·53	50·74	50·22	43·61
24	37·80	40·10	43·60	46·55	53·11	59·53	64·68	60·80	58·41	50·89	50·13	43·10
25	37·80	39·90	43·60	46·68	53·70	59·54	64·34	60·71	58·41	51·03	49·96	42·60
26	37·79	39·79	43·50	46·92	54·20	59·64	64·02	60·59	58·55	50·93	49·98	42·22
27	37·70	39·72	43·15	47·06	54·53	59·39	63·70	60·60	58·50	50·61	49·72	42·34
28	37·60	39·66	42·79	47·02	54·82	59·35	63·58	60·51	58·28	50·33	49·59	42·74
29	37·52		42·61	47·05	55·10	59·27	63·09	60·31	57·98	49·99	49·31	43·08
30	37·60		42·61	47·30	55·33	59·34	62·98	60·20	57·70	49·69	48·94	43·20
31	38·37		42·60		55·40		63·00	60·05		49·08		43·32
Means.	40·33	40·43	42·61	45·62	51·46	57·89	63·29	61·94	58·62	53·02	49·74	45·16

The mean of the twelve monthly values is 50°·84.

(V.)—Reading of a Thermometer whose bulb is sunk to the depth of 1 inch below the surface of the soil, at Noon on every Day of the Year.

1881.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	37·4	37·0	34·0	41·8	50·2	62·1	66·0	61·3	56·3	53·5	39·2	45·4
2	40·8	38·9	34·8	43·2	51·0	63·7	65·1	63·0	56·1	53·0	40·9	46·0
3	41·5	44·2	35·6	40·9	48·3	64·0	66·4	68·5	56·3	53·2	41·9	45·3
4	40·0	44·0	38·2	41·1	48·3	65·2	69·8	65·1	56·1	53·0	50·2	43·1
5	40·6	42·0	43·0	41·4	52·0	63·0	72·0	67·3	58·0	49·3	52·2	45·8
6	39·0	37·4	45·7	43·0	54·7	56·3	68·0	66·0	58·1	49·1	52·0	43·5
7	37·9	36·0	48·3	44·2	54·0	54·5	61·9	65·1	58·3	50·9	49·2	45·3
8	36·1	42·0	45·0	44·0	54·0	53·5	62·7	66·0	57·9	50·0	53·6	42·2
9	37·5	41·0	45·1	45·1	53·2	53·0	61·7	61·9	58·6	48·6	49·1	41·0
10	37·4	44·5	47·6	46·0	51·0	54·0	62·9	62·2	57·1	48·2	51·0	38·8
11	36·3	39·1	47·5	49·1	49·2	55·0	65·8	61·2	56·0	53·7	51·8	37·8
12	33·5	37·0	46·0	49·5	52·8	59·0	67·9	60·0	57·0	52·0	52·7	39·0
13	33·0	36·2	44·3	51·3	54·3	59·8	67·2	58·2	56·8	50·1	52·3	37·8
14	31·2	38·0	44·0	51·8	55·4	59·3	68·7	58·4	57·3	53·0	51·4	38·2
15	29·0	38·9	42·3	51·0	56·2	61·1	72·7	59·3	56·0	48·3	50·1	40·5
16	29·5	38·2	42·2	50·7	52·8	62·7	72·3	61·4	54·2	43·2	50·0	40·3
17	28·4	37·5	43·0	50·9	53·0	63·3	70·4	61·0	57·1	43·9	50·2	43·0
18	29·0*	40·4	44·3	52·6	54·2	61·3	71·7	59·9	59·0	41·0	45·0	42·1
19	28·5*	38·8	46·0	46·0	54·0	61·0	72·6	61·0	60·0	45·6	48·3	40·2
20	28·0*	39·7	46·2	44·1	54·3	62·3	68·0	58·9	59·8	46·8	49·1	40·9
21	29·0*	36·0	43·0	43·0	53·9	63·2	65·0	60·8	60·1	47·2	49·9	40·1
22	30·0*	35·7	39·3	43·8	56·3	62·9	64·6	59·6	56·4	47·9	50·9	36·8
23	32·0	35·7	40·8	45·0	58·0	62·4	64·7	61·7	57·0	49·4	49·2	35·2
24	30·6	35·5	44·0	47·0	58·0	63·0	66·0	60·0	58·7	49·0	48·3	34·8
25	30·4	36·7	41·0	50·0	60·0	62·1	63·0	59·6	60·0	47·0	50·3	35·5

The symbol * indicates that the reading was estimated.

(V.)—Reading of a Thermometer whose bulb is sunk to the depth of 1 inch below the surface of the soil, at Noon on every Day of the Year—*concluded.*

1881.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
26	29·0	36·5	38·7	47·6	59·3	60·3	63·1	61·0	58·0	46·5	46·2	40·8
27	32·8	36·3	38·3	47·1	59·9	61·2	62·1	58·9	55·9	44·9	46·5	41·8
28	32·4	35·0	38·9	48·3	60·0	60·1	60·0	57·3	54·5	44·8	47·2	40·6
29	37·5		39·8	50·2	59·0	61·2	63·6	59·6	54·1	43·9	44·0	42·0
30	40·0		39·7	52·0	58·0	62·6	64·0	60·0	54·0	41·7	44·8	41·8
31	39·3		40·8		59·8		62·1	57·3		38·8		41·8
Means.	34·1	38·5	42·2	46·7	54·7	60·4	66·2	61·3	57·2	48·0	48·6	40·9

The mean of the twelve monthly values is 49°·90.

(VI.)—Reading of a Thermometer within the case covering the deep-sunk Thermometers, whose bulb is placed on a level with their scales, at Noon on every Day of the Year.

1881.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	38·5	35·4	36·3	48·8	54·8	74·5	78·0	67·8	56·3	59·2	37·8	45·8
2	42·8	43·5	39·5	47·8	57·4	74·3	74·9	69·7	57·1	58·1	41·3	51·7
3	41·4	50·6	38·8	42·2	49·2	73·2	77·0	69·9	56·1	59·8	44·5	48·6
4	40·6	48·9	42·5	45·3	53·0	77·4	81·9	73·0	58·0	54·5	58·6	42·7
5	41·1	42·6	51·8	45·2	61·2	63·8	85·4	79·8	61·5	47·3	59·9	47·8
6	40·4	37·7	52·3	47·3	64·0	54·5	67·0	68·4	62·3	51·0	54·3	46·6
7	39·8	35·0	56·0	48·9	63·2	52·5	60·4	70·3	60·1	52·8	53·8	45·0
8	34·9	47·6	47·4	51·2	61·4	56·0	63·7	71·8	61·0	47·2	51·0	43·8
9	37·2	43·5	50·7	53·0	56·9	55·2	67·0	61·6	61·5	48·3	51·2	39·8
10	34·0	49·0	57·5	56·3	52·0	57·1	67·6	63·2	57·0	52·2	55·8	33·7
11	33·2	36·5	52·0	58·9	54·0	63·0	74·0	65·0	54·9	60·2	55·5	33·3
12	30·6	38·5	48·0	55·2	63·4	66·3	75·9	57·8	58·1	56·2	56·8	38·5
13	30·3	39·1	45·2	63·3	66·8	67·2	75·8	57·8	60·2	51·4	57·8	35·5
14	24·7	39·7	49·0	59·7	64·0	65·8	79·1	60·0	62·9	55·1	52·1	41·5
15	25·5	40·1	48·2	58·5	63·4	71·0	87·3	63·5	55·0	48·6	53·2	41·7
16	22·6	41·3	49·4	58·0	52·5	70·9	81·8	66·2	57·2	44·0	53·6	42·0
17	25·0	38·8	48·3	61·6	59·1	68·3	75·3	63·3	65·8	53·1	52·8	46·5
18	28·5	44·6	52·0	61·6	58·0	62·9	83·9	61·8	67·6	53·2	45·0	41·8
19	26·0	37·5	53·0	41·8	60·2	67·4	83·5	65·1	64·7	50·8	52·8	42·7
20	21·8	38·3	51·5	41·3	62·1	68·7	66·4	65·0	66·9	52·6	54·9	41·2
21	27·6	34·2	43·5	44·6	63·3	68·0	67·8	64·8	62·2	48·9	51·7	40·7
22	22·0	33·7	35·4	46·9	67·6	68·4	63·2	66·9	56·4	48·4	52·8	34·3
23	33·0	35·4	47·5	51·2	69·0	69·0	68·1	68·0	58·3	50·5	53·4	31·5
24	27·6	37·0	47·3	53·0	66·5	71·9	70·0	62·2	64·4	48·3	52·0	35·2
25	27·5	37·8	42·9	56·4	70·9	63·6	66·5	62·1	65·7	47·3	51·7	36·7
26	23·9	39·0	40·2	52·0	64·2	66·2	67·2	66·6	63·4	47·8	47·3	44·8
27	41·3	37·5	42·1	52·3	63·3	63·4	62·7	61·9	57·2	44·0	47·1	42·4
28	38·2	34·0	44·7	56·4	63·0	64·3	68·8	62·0	58·7	46·8	51·8	40·0
29	47·0		45·8	58·1	62·4	68·0	69·2	61·8	59·0	41·6	45·1	44·7
30	46·2		44·9	60·6	68·2	70·2	65·2	65·0	59·2	41·7	46·4	43·3
31	45·8		45·6		71·9		63·5	56·5		35·3		43·6
Means.	33·4	39·9	46·7	52·6	61·5	66·1	72·2	65·1	60·3	50·2	51·4	41·5

The mean of the twelve monthly values is 53°·41.

ABSTRACT of the CHANGES of the DIRECTION of the WIND, as derived from the Records of OSLER'S ANEMOMETER.

1881, Month.	Direction of the Wind. At beginning of Month.	Direction of the Wind. At end of Month.	Apparent Motion.	Times of Shifts of the Recording Pencil.	Amount of Motion.	Monthly Excess of Motion. Direct.	Monthly Excess of Motion. Retrograde.
			°	d h m	°	°	°
January . .	W.S.W.	W.S.W.	0	17. 0. 0	− 360		
				21. 0. 0	− 360		
				23. 21. 0	+ 360		
				25. 21. 0	+ 360	0	
				27. 0. 0	+ 360		
				27. 21. 10	− 360		
February .	W.S.W.	N.N.W.	+ 90	9. 8. 40	+ 360		
				14. 8. 45	− 360		
				15. 21. 50	+ 720		
				18. 2. 50	+ 360	1170	
				25. 8. 45	+ 360		
				27. 0. 0	− 360		
March . . .	N.N.W.	N.E.	+ 67½	3. 0. 0	− 360		
				3. 8. 40	− 720		
				4. 0. 0	− 360		
				4. 8. 40	+ 360		
				15. 2. 45	− 360		652½
				16. 21. 5	+ 720		
				17. 0. 0	+ 360		
				23. 0. 0	+ 360		
				26. 8. 50	− 720		
				27. 8. 5	− 360		
				31. 8. 40	+ 360		
April	N.E.	S.W.	−180	6. 0. 0	− 360		
				8. 2. 50	− 360		
				8. 21. 0	+ 360		
				11. 2. 50	+ 360		
				13. 0. 0	− 360		
				14. 8. 45	+ 360		
				15. 7. 45	+ 360		180
				15. 21. 0	− 360		
				21. 21. 0	+ 360		
				23. 1. 40	− 360		
				27. 21. 10	+ 360		
				28. 0. 0	− 360		
May	S.W.	S.E.	+270	1. 21. 0	− 360		
				3. 21. 0	+ 360		
				8. 21. 10	− 360		
				10. 2. 55	+ 360		
				11. 2. 50	+ 360		
				13. 0. 0	+ 360		
				15. 7. 45	+ 360	2430	
				21. 0. 0	− 720		
				23. 2. 40	+ 360		
				25. 21. 10	+ 720		
				30. 8. 40	+ 360		
				31. 0. 0	+ 360		

1881, Month.	Direction of the Wind. At beginning of Month.	Direction of the Wind. At end of Month.	Apparent Motion.	Times of Shifts of the Recording Pencil.	Amount of Motion.	Monthly Excess of Motion. Direct.	Monthly Excess of Motion. Retrograde.
			°	d h m	°	°	°
June	S.E.	S.S.E	−337½	1. 2. 55	− 360		
				3. 0. 0	+ 360		
				3. 21. 5	+ 360		
				11. 0. 0	− 720		
				11. 8. 0	+ 360		
				14. 2. 45	+ 360	22½	
				15. 0. 0	+ 360		
				19. 21. 0	+ 720		
				24. 0. 0	− 360		
				24. 2. 50	− 360		
				26. 7. 45	− 360		
July	S.S.E.	W.N.W.	+135	1. 2. 40	− 360		
				1. 21. 0	+ 720		
				3. 0. 0	+ 360		
				5. 0. 0	+ 360		
				5. 2. 30	− 720		
				14. 3. 0	+ 720		
				14. 21. 10	− 360		
				15. 3. 0	− 360	495	
				15. 8. 30	− 360		
				17. 0. 0	− 360		
				17. 7. 15	+ 360		
				20. 10. 0	+ 360		
				21. 0. 0	− 360		
				29. 0. 0	+ 360		
August . . .	W.N.W.	N.N.W.	+ 45	1. 0. 0	− 720		
				1. 1. 50	− 360		
				2. 8. 15	+ 360		
				12. 0. 0	− 360		
				12. 8. 15	+ 360		
				17. 21. 0	− 360		1035
				18. 21. 0	− 360		
				21. 0. 0	− 360		
				23. 0. 0	− 360		
				23. 9. 50	+ 360		
				28. 0. 0	+ 720		
September	N.N.W.	E.N.E.	+ 90	4. 0. 0	− 360		
				6. 0. 0	+ 360		
				6. 21. 10	− 360		
				14. 9. 40	+ 360		
				14. 21. 10	− 360		
				18. 0. 0	+ 720	1170	
				18. 8. 10	+ 360		
				20. 0. 0	− 360		
				21. 0. 0	+ 360		
				22. 8. 20	− 360		

The sign + implies that the change in the direction of the wind has taken place in the order N., E., S., W., N., &c., or in *direct* motion; the sign − implies that the change has taken place in the order N., W., S., E., N., &c., or in *retrograde* motion.

The times of shifts of the recording pencil, as given above, refer to the shifts made by hand, when, by the turning of the vane, the trace tends to travel or has travelled out of range.

ABSTRACT of the CHANGES of the DIRECTION of the WIND, as derived from the Records of OSLER'S ANEMOMETER—*concluded.*

1881, Month.	Direction of the Wind. At beginning of Month.	Direction of the Wind. At end of Month.	Apparent Motion.	Times of Shifts of the Recording Pencil.	Amount of Motion.	Monthly Excess of Motion. Direct.	Monthly Excess of Motion. Retrograde.
			°	d h m	°	°	°
September—*cont.*				25. 0. 0	+ 360		
				27. 21. 0	+ 360		
October . .	E.N.E.	S.E.	+ 67½	2. 8. 50	+ 360	787½	
				3. 2. 45	− 360		
				17. 0. 0	+ 360		
				20. 0. 0	− 360		
				20. 9. 45	+ 360		
				21. 21. 15	+ 360		
				30. 21. 5	− 360		
				31. 0. 0	+ 360		
November	S.E.	S.S.E.	− 337½	2. 2. 50	− 360	382½	
				3. 9. 15	+ 360		
				10. 0. 30	+ 360		
				18. 0. 0	+ 360		
December	S.S.E.	S.S.W.	+ 45	6. 21. 0	+ 360	405	
				9. 8. 45	+ 360		
				10. 0. 0	− 360		
				13. 9. 10	+ 360		
				21. 21. 0	− 360		

The sign + implies that the change in the direction of the wind has taken place in the order N., E., S., W., N., &c., or in *direct* motion; the sign − implies that the change has taken place in the order N., W., S., E., N., &c., or in *retrograde* motion.

The times of shifts of the recording pencil, as given above, refer to the shifts made by hand, when, by the turning of the vane, the trace tends to travel or has travelled out of range.

The whole excess of direct motion for the year was 4995°.

The revolution-counter which is attached to the vertical spindle of the vane, whose readings increase with change of direction of the wind in *direct* motion, and decrease with change of direction in *retrograde* motion, gave the following readings:—

	revs.
On 1880, December 31^d. 12^h	35·1
On 1881, December 31^d. 12^h	49·0

Implying an excess of direct motion, during the year, of 13·9 revolutions, or 5004°.

Mean Hourly Measures of the Horizontal Movement of the Air in each Month, and Greatest and Least Hourly Measures, as derived from the Records of Robinson's Anemometer.

Hour ending	1881. January.	February.	March.	April	May.	June.	July.	August.	September.	October.	November.	December.	Mean for the Year.
h	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
1 a.m.	10·6	11·9	12·9	12·4	9·5	7·2	8·6	10·9	7·3	10·5	14·6	12·1	10·7
2 a.m.	10·2	11·2	12·9	12·4	8·8	6·9	8·5	11·2	6·9	10·5	14·3	12·1	10·5
3 a.m.	9·9	11·5	12·9	12·9	9·0	7·0	8·4	10·7	7·2	10·9	14·1	11·6	10·5
4 a.m.	10·1	12·1	12·5	11·7	9·3	7·1	8·7	10·6	6·9	10·2	13·9	10·7	10·3
5 a.m.	9·9	12·4	12·3	11·6	8·9	7·7	9·2	10·3	6·9	10·2	14·6	11·1	10·4
6 a.m.	10·2	12·2	12·1	11·8	9·5	7·6	8·3	10·1	7·2	10·5	14·0	10·4	10·3
7 a.m.	10·1	12·4	12·1	12·2	9·9	8·2	9·3	10·6	6·7	10·9	15·0	11·1	10·7
8 a.m.	9·7	12·4	12·3	13·6	11·1	8·9	10·3	11·1	7·4	11·3	14·9	11·5	11·2
9 a.m.	9·6	12·8	12·8	14·7	12·5	9·8	10·7	12·4	7·5	12·4	15·2	12·0	11·9
10 a.m.	9·1	13·4	13·3	15·7	12·7	10·9	10·4	13·3	8·1	13·5	15·6	11·8	12·3
11 a.m.	10·1	14·1	15·1	17·2	14·5	11·1	11·2	13·7	8·5	15·1	16·0	13·1	13·3
Noon.	11·3	14·9	16·4	17·9	14·3	11·6	11·3	15·0	9·2	16·2	17·0	12·9	14·0
1 p.m.	11·0	14·5	16·0	18·5	15·1	11·9	11·8	15·0	8·6	16·1	16·7	13·5	14·1
2 p.m.	12·2	15·3	15·8	18·1	15·6	12·1	12·9	15·5	10·0	16·6	17·1	14·3	14·6
3 p.m.	11·9	15·0	15·7	18·3	15·5	12·2	13·2	15·1	9·9	17·0	16·3	14·1	14·5
4 p.m.	11·7	15·0	16·2	18·5	16·3	12·5	13·9	14·6	10·3	16·5	15·1	14·0	14·5
5 p.m.	11·7	13·9	16·3	18·7	15·3	11·9	13·8	14·6	9·4	14·4	14·4	12·6	13·9
6 p.m.	12·0	13·5	15·1	17·5	14·6	12·2	13·2	14·1	9·2	13·5	14·0	12·5	13·4
7 p.m.	11·3	13·6	14·5	15·2	13·2	10·6	13·1	12·7	8·6	12·2	14·6	12·3	12·7
8 p.m.	11·4	12·9	14·0	14·2	11·6	9·8	12·0	12·2	9·0	12·0	15·3	13·4	12·3
9 p.m.	10·8	12·0	13·8	13·8	10·2	8·3	10·7	12·6	8·0	12·1	14·4	13·1	11·7
10 p.m.	10·1	11·7	13·4	13·3	10·0	7·8	9·9	12·4	7·8	11·2	14·8	12·3	11·2
11 p.m.	10·4	11·3	13·7	13·3	9·4	8·2	9·8	11·6	7·4	11·7	14·6	12·5	11·2
Midnight.	10·6	11·3	13·6	13·4	9·4	7·9	9·0	11·4	7·3	10·8	14·5	12·5	11·0
Means	10·7	13·0	14·0	14·9	11·9	9·6	10·8	12·6	8·1	12·8	15·0	12·4	12·1
Greatest Hourly Measures	47	52	42	42	33	30	29	33	26	61	53	50	..
Least Hourly Measures	0	0	0	1	0	0	0	0	0	0	0	0	..

MEAN ELECTRICAL POTENTIAL of the ATMOSPHERE, derived from THOMSON'S ELECTROMETER, for each CIVIL DAY, as deduced from TWENTY-FOUR HOURLY MEASURES of ORDINATES of the Photographic Register on that DAY.

(The scale employed is arbitrary; the zero reading is 10·000, and numbers greater than 10·000 indicate positive potential.)

1881.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d												
1	10·655	..	10·436	10·196	10·237	10·293	10·169	10·404	10·297	10·274	10·330	10·117
2	10·336	..	10·513	10·039	10·127	10·387	10·148	10·075	10·217	10·299	10·649	10·263
3	10·415	10·082	10·437	10·224	10·306	9·993	10·352	10·244	10·260	10·264	10·272	10·396
4	10·560	10·160	9·992	10·281	10·220	10·203	10·267	10·307	10·375	10·263	10·049	10·272
5	10·313	9·950	10·035	10·335	10·372	10·083	10·289	10·389	10·284	10·547	10·101	10·146
6	10·345	10·411	10·112	10·305	10·224	9·443	9·720	10·268	10·156	10·413	10·141	10·196
7	10·464	10·313	10·086	10·319	10·194	..	10·243	10·348	..	10·387	10·133	10·303
8	..	10·145	10·184	10·292	10·333	..	10·186	10·063	10·134	9·790	10·059	10·621
9	10·622	10·227	10·140	10·315	10·338	..	10·165	10·278	10·036	10·277	10·290	10·130
10	10·509	10·132	10·115	10·385	10·309	..	10·260	10·357	10·164	10·453	10·150	10·310
11	10·478	10·177	10·208	10·273	10·386	..	..	10·342	10·105	10·189	10·110	10·258
12	10·452	10·546	10·258	..	10·341	..	..	10·065	..	10·191	10·079	9·947
13	..	10·480	10·229	10·284	10·168	..	10·272	10·249	10·334	10·153	10·088	10·312
14	..	10·219	10·308	10·243	10·262	10·139	10·426	10·318	10·418	..	10·072	10·384
15	..	10·380	10·346	10·123	9·845	10·157	10·223	10·443	10·191	..	10·115	9·984
16	..	10·409	10·397	10·298	9·975	10·345	10·172	10·398	10·214	..	10·098	9·998
17	..	10·300	10·179	10·233	10·270	10·103	10·316	9·939	10·442	..	10·329	9·981
18	..	10·267	10·393	10·061	10·190	10·052	10·372	10·201	10·127	..	10·408	10·296
19	..	10·104	10·321	10·177	10·231	10·252	10·090	10·210	10·295	..	10·265	10·445
20	..	9·825	10·334	10·301	10·247	10·193	10·064	10·414	10·259	..	10·127	10·136
21	..	9·815	10·208	10·319	10·227	10·132	10·302	10·350	..	10·122	10·230	10·497
22	..	10·396	10·374	10·145	10·217	10·201	10·298	10·463	10·110	..	10·415	10·624
23	..	10·252	10·236	10·057	10·062	10·078	10·327	10·252	10·118	..	10·400	10·295
24	..	10·388	10·188	10·231	10·220	10·303	10·418	10·390	10·114	..	10·269	10·349
25	..	10·317	10·287	10·158	10·251	10·198	10·264	10·239	10·201	..	10·070	10·241
26	..	10·463	10·160	9·825	9·889	10·456	10·155	10·253	10·197	10·464	10·244	10·047
27	..	10·419	10·382	10·176	9·965	10·411	10·186	10·311	10·300	10·470	..	10·099
28	..	10·474	10·414	10·155	10·025	10·359	10·407	..	10·240	10·516	10·172	10·177
29	..		10·265	10·206	10·085	10·340	10·106	10·083	10·375	10·562	10·548	10·146
30	..		10·416	10·170	10·324	10·445	10·379	10·094	10·345	10·743	10·306	10·103
31	..		10·275		10·351		10·137	10·458		10·615		10·106
Means -	10·468	10·256	10·265	10·211	10·200	10·199	10·231	10·273	10·234	10·330	10·225	10·232

The mean of the twelve monthly values is 10·262.

MONTHLY MEAN ELECTRICAL POTENTIAL of the ATMOSPHERE, derived from THOMSON'S ELECTROMETER, at every HOUR of the DAY, as deduced from the PHOTOGRAPHIC RECORDS.

(The scale employed is arbitrary; the zero reading is 10·000, and numbers greater than 10·000 indicate positive potential.)

Hour, Greenwich Mean Solar Time (Civil reckoning).	1881.												Yearly Means.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
Midnight	10·447	10·274	10·340	10·306	10·342	10·329	10·362	10·445	10·307	10·414	10·245	10·237	10·337
1h. a.m.	10·446	10·259	10·349	10·288	10·347	10·354	10·289	10·415	10·291	10·396	10·217	10·225	10·323
2 „	10·440	10·219	10·302	10·279	10·328	10·343	10·270	10·381	10·263	10·336	10·190	10·192	10·295
3 „	10·421	10·230	10·303	10·234	10·294	10·276	10·296	10·359	10·240	10·331	10·165	10·182	10·278
4 „	10·383	10·220	10·263	10·261	10·273	10·247	10·334	10·359	10·219	10·325	10·133	10·164	10·265
5 „	10·380	10·227	10·289	10·259	10·236	10·299	10·336	10·376	10·201	10·319	10·109	10·155	10·266
6 „	10·413	10·152	10·282	10·271	10·328	10·289	10·359	10·382	10·201	10·310	10·108	10·132	10·269
7 „	10·316	10·115	10·298	10·271	10·228	10·369	10·411	10·455	10·188	10·282	10·123	10·157	10·268
8 „	10·401	10·211	10·256	10·256	10·236	10·303	10·373	10·456	10·179	10·290	10·153	10·132	10·271
9 „	10·415	10·200	10·229	10·166	10·237	10·184	10·300	10·369	10·151	10·255	10·178	10·169	10·238
10 „	10·456	10·257	10·175	10·121	10·137	10·107	10·187	10·245	10·111	10·200	10·226	10·159	10·198
11 „	10·449	10·278	10·150	10·064	9·996	10·078	10·099	10·212	10·147	10·283	10·257	10·211	10·185
Noon	10·474	10·278	10·224	10·101	10·059	10·035	10·067	10·224	10·178	10·308	10·280	10·257	10·207
1h. p.m.	10·466	10·293	10·243	10·099	10·010	10·064	10·073	10·207	10·218	10·341	10·286	10·292	10·216
2 „	10·482	10·300	10·237	10·092	10·052	10·036	10·091	10·144	10·247	10·329	10·282	10·270	10·213
3 „	10·475	10·338	10·176	10·065	10·037	10·000	9·985	10·092	10·227	10·354	10·228	10·281	10·188
4 „	10·524	10·373	10·242	10·093	10·013	10·060	10·070	9·860	10·230	10·398	10·285	10·304	10·204
5 „	10·539	10·303	10·205	10·146	10·061	10·076	10·089	10·005	10·227	10·383	10·276	10·331	10·220
6 „	10·542	10·313	10·155	10·190	10·082	10·088	10·091	10·055	10·183	10·373	10·290	10·356	10·227
7 „	10·615	10·332	10·250	10·247	10·212	10·178	10·086	10·219	10·313	10·300	10·302	10·337	10·283
8 „	10·593	10·339	10·346	10·308	10·262	10·203	10·217	10·238	10·355	10·428	10·293	10·267	10·321
9 „	10·547	10·240	10·367	10·309	10·346	10·245	10·346	10·262	10·333	10·506	10·272	10·262	10·336
10 „	10·537	10·203	10·359	10·326	10·344	10·227	10·412	10·381	10·317	10·489	10·252	10·256	10·342
11 „	10·471	10·183	10·331	10·319	10·329	10·374	10·411	10·422	10·281	10·441	10·245	10·229	10·336
Means	10·468	10·256	10·265	10·211	10·200	10·199	10·231	10·273	10·234	10·350	10·225	10·232	10·262
Number of Days employed	11	26	31	29	31	23	29	30	27	20	29	31	..

AMOUNT OF RAIN COLLECTED IN EACH MONTH OF THE YEAR 1881.

1881, MONTH.	Number of Rainy Days.	Monthly Amount of Rain collected in each Gauge.							
		Self-registering Gauge of Osler's Anemometer.	Second Gauge at Osler's Anemometer.	On the Roof of the Octagon Room.	On the Roof of the Magnetic Observatory.	On the Roof of the Photographic Thermometer Shed.	Gauges partly sunk in the ground.		
		No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	No. 8.
		in.	in.	in.	in.	in.	in.	in.	in.
January	9	0·708	0·760	1·034	1·067	1·150	1·663	1·348	..
February	18	1·103	1·344	1·792	1·954	2·367	2·446	2·350	..
March	11	1·140	1·228	1·407	1·504	1·701	1·835	1·690	..
April	8	0·298	0·360	0·461	0·560	0·612	0·623	0·480	..
May	13	0·875	0·955	1·241	1·396	1·542	1·611	1·363	..
June	9	1·202	1·292	1·649	1·724	1·837	1·863	1·630	..
July	12	1·538	1·574	1·842	1·992	2·072	2·137	1·980	2·048
August	17	2·752	2·943	3·342	3·589	3·783	3·888	3·732	3·749
September	15	1·525	1·583	1·825	2·017	2·128	2·188	2·108	2·071
October	13	2·003	2·212	2·305	2·425	2·692	2·711	2·572	2·690
November	16	0·988	1·007	1·413	1·797	2·127	2·265	2·272	2·289
December	15	1·250	1·376	1·822	2·107	2·380	2·495	2·428	2·450
Sums	156	15·382	16·634	20·133	22·132	24·391	25·725	23·953	...
Height of receiving Surface above the ground.	..	ft. in. 50. 8	ft. in. 50. 8	ft. in. 38. 4	ft. in. 21. 9	ft. in. 10. 0	ft. in. 0. 5	ft. in. 0. 5	ft. in. 0. 5
Height of receiving Surface above mean sea level.	..	ft. in. 205. 6	ft. in. 205. 6	ft. in. 193. 2	ft. in. 176. 7	ft. in. 164. 10	ft. in. 155. 3	ft. in. 155. 3	ft. in. 155. 3

ROYAL OBSERVATORY, GREENWICH.

OBSERVATIONS

OF

LUMINOUS METEORS.

1881.

Month and Day, 1881.		Greenwich Mean Solar Time.	Observer.	Apparent Size of Meteor in Star-Magnitudes.	Colour of Meteor.	Duration of Meteor in Seconds of Time.	Appearance and Duration of Train.	Length of Meteor's Path in Degrees.	No. for Reference.
		h m s				s		°	
March	1	9. 22. 34	S.	1	Bluish-white	. .	Slight	. .	1
,,		9. 49. 26	S.	3	White	. .	None	. .	2
June	19	10. 12. 0	N.	2	White	0·6	. . .	. .	3
August	10	9. 41. 10	J.	3	Bluish-white	0·5	Fine	15	4
,,		9. 51. 53	N.	> 1	White	0·4	Train	6	5
,,		10. 2. 21	J.	2	Bluish-white	0·5	None	20	6
,,		10. 3. 40	J.	3	Bluish-white	0·5	None	20	7
,,		10. 9. 35	J.	4	White	0·5	None	10	8
,,		10. 23. 1	J.	2	Bright Yellow	1	None	10	9
,,		10. 40. 47	J.	1	White	1	None	20	10
,,		10. 41. 11	N.	Jupiter	White	0·4	Train	5	11
,,		10. 48. 33	J.	2	Bluish-white	1·5	None	30	12
,,		10. 54. 1	N.	2	White	0·5	None	5	13
,,		10. 57.	H.	2	White	0·5	. . .	10	14
,,		11. 4. 10	N.	3	Bluish-white	0·4	None	5	15
,,		11. 4. 20	N.	1	Bluish-white	0·6	Train	12	16
,,		11. 9. 56	N.	2	White	0·4	Train	3	17
,,		11. 10. 51	J.	3	White	0·5	None	10	18
,,		11. 29. 29	J.	2	White	0·5	None	10	19
,,		11. 30. 29	N.	1	White	1	Train	15	20
,,		11. 36. 36	J.	> 1	Bluish-white	1	Slight	20	21
,,		11. 37. 10	N.	2	White	0·5	Train	6	22
,,		11. 48. 56	N., J.	1	Bluish-white	0·7	None	12	23
,,		11. 51. 20	N.	2	White	0·5	None	9	24
,,		12. 3. 57	N.	1	White	0·7	Train	12	25
,,		12. 24. 55	N., J.	> 1	White	0·5	Slight	6	26
,,		12. 34. 31	N.	2	White	0·5	Slight	5	27
,,		12. 45. 35	N.	2	White	0·5	Train	10	28
,,		12. 45. 57	J.	2	Bluish-white	0·5	None	7	29
,,		12. 49. 32	N.	> 1	White	1	Fine	15	30
,,		12. 58. 30	N.	> 1	White	1 +	Train	12	31
,,		13. 4. 20	N.	2	White	0·5	Slight	7	32
,,		13. 10. 25	N.	> 1	White	0·5	Slight	5	33
August	18	9. 16. ±	H.	Arcturus × 3	Bluish-white	2	Splendid	30	34
,,		9. 17. 50	N.	> 1	White	0·7	Train	15	35
August	21	8. 50. ±	E.	> Venus	Bluish-white	1	. . .	15	36
August	24	8. 25.	H.	1	Bluish-white	1	None	10	37
,,		10. 44.	H.	2	White	0·5	None	5	38
,,		10. 57. 30	H.	3	Bluish-white	1	None	10	39
,,		11. 31. 0	N.	1	White	1	Train	10	40
August	26	8. 52. 45	N.	> 1	White	1·5	Train	30	41
August	27	9. 37. 35	N.	2	White	0·5	Train	12	42
September	3	8. 23. 57	N.	2	White	0·4	None	7	43
September	18	7. 45.	H.	> 1	Bluish-white	2	Slight	30	44
September	19	9. 38. 20	N.	2	White	0·5	. . .	5	45
October	6	9. 18. 30	H.	> 1	White	0·5	None	10	46
October	14	10. 6.	N.	> 1	Blue	1·5	Fine	20±	47
October	17	9. 14. 42	N.	3	White	0·5	None	7	48
,,		10. 8. 30	G.	2	Bluish-white	0·5	None	15	49

No. for Reference.	Path of Meteor through the Stars.
1	Shot from a point near θ Leonis downwards, inclining to right.
2	Shot from a point to right of β Persei to a point midway between γ and β Trianguli.
3	From direction of Arcturus towards ζ Boötis.
4	Appeared a little above α Ursæ Majoris and disappeared to the left of and above δ Ursæ Majoris.
5	Appeared about 10° above Capella, and pursued a path parallel to Capella and β Aurigæ, moving from direction of γ Persei.
6	Appeared midway between β Ursæ Minoris and κ Draconis, passed beneath α Draconis, and disappeared a little above η Ursæ Majoris.
7	Appeared midway between β Ursæ Minoris and κ Draconis, passed beneath α Draconis, and disappeared a little above η Ursæ
8	Appeared below δ Cassiopeiæ, and fell slantingly towards north. [Majoris (path similar to that of preceding meteor).
9	Appeared a little above Capella, disappeared a little below β Aurigæ.
10	Appeared near ζ Aquilæ and shot vertically downwards, disappearing before reaching the horizon.
11	Passed 10° below α Arietis, moving from direction of α Persei.
12	Shot from near Polaris and disappeared near α Ursæ Majoris.
13	Moved towards β Ursæ Majoris from direction of Perseus.
14	From direction of α Persei shot across ϵ Cassiopeiæ.
15	From direction of Perseus passed at angle of 45° between Jupiter and Saturn.
16	Passed across α Andromedæ towards α Pegasi.
17	From a point about 1° to right of centre of line joining α and γ Persei, moved towards γ Andromedæ. [Mr. Hugo describes
	the meteor as having "shot from direction of a point midway between α and γ Persei, towards a point about 2° below
18	Appeared midway between Polaris and α Ursæ Majoris, disappearing to the right of α Ursæ Majoris. [γ Andromedæ."]
19	Appeared about 12° above, and disappeared a little to right of Jupiter.
20	Passed across γ Pegasi at right angles to line joining γ and β Pegasi from direction of Perseus. [Mr. Hugo describes the meteor
21	Appeared above α Ursæ Majoris and passed between γ and δ Ursæ Majoris. [as having "shot from direction of γ Andromedæ
22	Passed between α and γ Cassiopeiæ, moving from direction of γ Andromedæ. [towards γ Pegasi."]
23	From direction of η Ursæ Majoris moved on path parallel to ϵ and ζ Ursæ Majoris.
24	From direction of δ Ursæ Majoris fell northwards at right angles to δ and ϵ Ursæ Majoris.
25	Fell vertically about 15° to right of Saturn.
26	From a point about 4° below and to left of Jupiter fell towards horizon at an angle of 45° (moving to right).
27	From a point about 2° to left of γ Cassiopeiæ moved northwards at right angles to line joining γ and β Cassiopeiæ.
28	Appeared 10° above ζ and η Ursæ Majoris, and moved westwards parallel to line joining those stars.
29	Appeared a little to right of α Ursæ Majoris, and disappeared near but below β Ursæ Majoris.
30	Appeared about 15° to left of η Ursæ Majoris, and fell to left at an angle of 45° towards horizon, moving from direction of
31	Passed midway between η Draconis and η Ursæ Majoris, moving from direction of β Ursæ Minoris. [η Draconis.
32	Passed almost midway between γ Draconis and α Lyræ, and nearly at right angles to line joining γ and β Draconis, moving
33	Appeared about 15° below ζ Ursæ Majoris, moving at angle of 45° to left, from direction of δ Ursæ Majoris. [downwards.
34	Passed near β Ursæ Minoris to a point a few degrees above Polaris, when it burst, showing a bright blue colour.
35	Moved from direction of λ Aquilæ towards ζ Ophiuchi.
36	From direction of γ Boötis shot vertically downwards, nearly bisecting line joining α Canum Venaticorum and Arcturus.
37	From direction of α Cassiopeiæ passed 1° to right of β Andromedæ.
38	From direction of α Cygni passed a little above ζ Cygni.
39	From direction of β Ursæ Minoris shot 1° to right of ζ Ursæ Majoris.
40	Fell vertically from a point nearly midway between δ and ζ Herculis to β Herculis.
41	From direction of a point midway between Polaris and γ Cephei disappeared at δ Persei.
42	From direction of a point nearly midway between Polaris and β Ursæ Minoris passed across ζ Ursæ Majoris.
43	Moving from direction of ϵ Ursæ Minoris, passed midway between Polaris and α Ursæ Majoris across a space in which no stars [could be seen.
44	Shot from α Lyræ in continuation of a line joining α Lyræ and a point 2° to right of δ Cygni.
45	Passed midway between α Lyræ and γ Draconis, moving from direction of a point between γ and η Cygni.
46	Moving from direction of Polaris towards a point about 5° to right of α Ursæ Majoris.
47	Fell nearly vertically, passing midway between β and η Draconis and close to τ Herculis.
48	From a point near β Ursæ Majoris moved towards χ Ursæ Majoris.
49	Appeared near ϵ Cassiopeiæ, moved in direction of α Cephei.

Month and Day. 1881.		Greenwich Mean Solar Time.	Observer.	Apparent Size of Meteor in Star-Magnitudes.	Colour of Meteor.	Duration of Meteor in Seconds of Time.	Appearance and Duration of Train.	Length of Meteor's Path in Degrees.	No. for Reference.
		h m s				s		°	
October	17	10. 20. 0	G.	1	Bluish-white	0·6	Slight	10	1
	,,	10. 23. 0	G.	3	Bluish-white	0·7	None	20	2
	,,	10. 41. 0	G.	1	Bluish-white	0·7	Train	12	3
	,,	10. 50. 10	G.	1	Blue	1	Very fine	15	4
October	18	9. 12. 51	H.	3	Bluish-white	0·5	None	5	5
	,,	9. 17. 31	H.	3	White	1	None	15	6
	,,	9. 21. 23	H.	2	Bluish-white	0·5	Slight	5	7
	,,	9. 24. 41	H.	2	Yellow	0·2	None	2	8
	,,	9. 49. 23	H.	2	Bluish-white	0·2	None	3	9
	,,	10. 7. 59	H.	1	Red	1	Train	5	10
	,,	11. 3. 14	N.	2	Bluish-white	0·5	Train	10	11
October	19	9. 2. 20	H.	2	Bluish-white	1	None	10	12
	,,	9. 33. 24	H.	3	Bluish-white	0·5	None	8	13
	,,	9. 37. 2	H.	1	Red	1	None	10	14
	,,	9. 53. 29	H.	1	Bluish-white	1	None	10	15
	,,	10. 6. 54	H.	1	Bluish-white	1	Train	15	16
October	29	10. 5. 44	N	> 1	Yellowish	2	Fine	25	17
November	17	10. 1. 30	H.	> 1	Yellowish	2	Slight	30	18
November	28	8. 52. 12	H.	> 1	Yellowish	2	None	30	19
	,,	10. 19. 15	H.	2	Yellowish	0·5	None	5	20
	,,	10. 22. 47	H.	3	Bluish-white	0·5	None	5	21
	,,	10. 54. 37	H.	3 increasing to > 1	Red	3	Fine	25	22
	,,	11. 14. 10	H.	3	Red	0·3	None	5	23
December	31	9. 24. 37	N.	> 1	White	0·5	..	7	24

No. for Reference.	Path of Meteor through the Stars.
1	From α Ursæ Majoris, disappeared between γ and δ Ursæ Majoris.
2	From Aldebaran to β Trianguli.
3	From direction of α Aquilæ, passed across δ Aquilæ.
4	Shot from α Persei, disappearing between γ and β Cassiopeiæ.
5	Moving from direction of β Camelopardali across δ Aurigæ.
6	From direction of Polaris shot between η and ι Draconis.
7	Shot from β Persei towards a point midway between α and δ Persei.
8	From δ Andromedæ moved vertically downwards.
9	From direction of ι Ceti to a point 5° to right of β Ceti.
10	Shot from ζ Ursæ Majoris to a point about 2° above η Ursæ Majoris.
11	From near λ Tauri passed across μ Tauri.
12	Shot across 41 Arietis towards a point a few degrees to left of Saturn.
13	Shot across δ Persei from direction of a point midway between α and β Camelopardali.
14	From a point 5° below ο Ursæ Majoris towards a point midway between α and β Ursæ Majoris.
15	Moved from direction of γ Ursæ Majoris across η Ursæ Majoris.
16	From a point 2° to right of α Delphini, disappeared near ξ Aquilæ.
17	From direction of a point midway between the Pleiades and Aldebaran to a point about 20° below γ Ceti.
18	Moving towards horizon, crossing a line joining γ and ε Cygni at right angles.
19	From direction of α Cephei shot between β and η Pegasi.
20	From direction of a point 3° above Mars passed near γ Geminorum.
21	Passed 1° below Aldebaran, moving from direction of ι Aurigæ.
22	From direction of β Tauri passed across a point 1° above θ Geminorum.
23	From a point 2° below ε Geminorum passed across γ Geminorum.
24	From a point about 10° or 12° below β Cassiopeiæ moved westward at an inclination of 45°.